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VOLUME 13, NUMBER 1

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# NEW YEAR TRANSFORMATION

**You have it in your power to make a change this year.** You can make 2015 the year for getting in the best shape of your life— it takes hard work and dedication, and the right scientifically backed workouts and training advice to help you reach your goals— fast. In this issue of FitnessRx for Men, we've got everything you need to muscle up, get lean and ripped, and get in your best shape ever in 2015.

If you want to transform your physique in 2015, a plan that combines high-intensity interval training with explosive weight training will help get the job done. In "The 60-Day New Year Transformation" by Thomas Fahey, Ed.D. on page 32, this cutting-edge program with our cover model Whitney Reid will build explosive power and increase muscle mass while promoting fat loss. High-speed training causes rapid results because it speeds communication between nerves and muscles, while overloading the fibers. This is a program that will increase muscle strength and size rapidly, promote fat loss and create long-term changes in the muscles that promote life-long fitness. Get ready to get in the best shape of your life this year— because this program works, and we have the science to prove it.

Good health is associated with good sex, according to research, and the keys to better sex include improving metabolic health, increasing testosterone levels, improving blood flow, cutting body fat and increasing stamina. In "The Better Sex Workout and Diet: A Scientific Approach" on page 52, our team has put together a complete guide to improving your sexual performance and health. The right diet and exercise program and proper lifestyle can have a positive impact on your sex life, so we provide you with the key lifestyle factors for better sex, as well as an effective diet and workout plan, and explain how sexual problems may also be a sign of an underlying health issue like diabetes or coronary artery disease.

If you want to take your training to a whole new level, circuit training is a great option. In "The 500-Rep Killer Fat-Incinerating Workout with IFBB Men's Physique Pro Sadik Hadzovic" on page 46, Sadik's program isn't for the faint of heart. This is the program that Sadik uses to break up his normal weight training and cardio regimen. It's simple but effective— a fat-shredding circuit comprised of five basic movements, all done for 10 reps with no rest, 10 times in a row for a total of 500 reps. Are you up for the challenge?

To help really jumpstart your new year, check out "The M.A.X. Muscle Plan: Complete Training and Nutrition Program for Building Your Best Body Ever" by Brad Schoenfeld, Ph.D., CSCS, FNSCA on page 40. A modified version of Dr. Schoenfeld's popular hypertrophy program, this plan will help you transform your physique before spring. By using a method called "block periodization," volume and load are manipulated over a three-month period for maximum results. According to research, there is a clear dose-response relationship that exists between volume and hypertrophy; increasingly greater workloads are associated with increasingly greater growth, at least up to a certain point. That being said, you just need to provide the dedication and effort, and the results are all but guaranteed.

The rest of the issue is packed with the latest scientifically backed research to help you get ripped, build muscle, blast fat and get in the best shape of your life this year. Check out our workouts, advice and tips, and get to work to make 2015 your best year yet. And for more, don't forget to check out our website, [www.fitnessrxformen.com](http://www.fitnessrxformen.com).

*Steve Blechman*

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YOUR ULTIMATE PRESCRIPTION FOR THE PERFECT BODY

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**CUTTING-EDGE  
RESEARCH!**



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# FitRx WARM UP

● THE LATEST NEWS AND RESEARCH FROM THE WORLD OF FITNESS



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● BY STEVE BLECHMAN AND THOMAS FAHEY, EdD



## GREATER ANABOLIC HORMONE RESPONSE THAN MACHINES

An ongoing controversy in strength training is the relative benefit of free weights versus weight machines. Gyms typically emphasize weight machines because they are more profitable and considered safer than free weights. Free weights and machines are not the same, even when they work the same muscle groups. For example, squats and leg presses appear similar, but squats are a closed kinetic-chain exercise, while leg presses are open chain. Closed kinetic chain means that the lower or upper body stays in contact with the ground during the movement. Free weights require more spinal stabilization, which increases the load of the exercises. Free weights also trigger a greater neural-hormonal response— according to a study led by Aaron Shaner and Disa Hatfield. Elevated anabolic hormones appear to promote muscle hypertrophy and strength. The researchers found that testosterone and growth hormone levels were greater following the squat than the leg press, even though the perception of effort during the exercise was equal. At least for large muscle, lower body exercises, free weights increase anabolic hormones more than weight machines. (Journal Strength Conditioning Research, 28: 1032-1040, 2014)

## CHAIN TRAINING PROMOTES STRENGTH

Chain training— also called accommodation resistance— involves attaching chains to each end of an Olympic weightlifting bar. Much of the chains are coiled on the ground at the beginning of an exercise such as a squat or bench press. The chains come off the ground as the exercise progresses, which increases the resistance by effectively increasing the weight lifted. A study by scientists from Iran, Ohio State University and Texas A&M University found that chain training was superior to traditional weight training for building lower body strength. However, chain training provided no additional benefit in building upper body strength and power or lower body power. This was a small study conducted for four weeks, so we need more research to adequately assess this technique. (PeerJ, published online DOI10.7717, 2014)

## SHOULD YOU INCLUDE KETTLEBELL TRAINING IN YOUR WEIGHT PROGRAM?



Kettlebell training uses high-speed, ballistic motions that derive power from the hips and legs, while sparing and stabilizing the back. Whole-body movements require carefully choreographed control patterns from the nervous system that build muscles functionally— the way we use them in sports and in life. Most kettlebell movements start from the basic athletic position, with knees bent, hips back, arms forward, chest out, and spine and head neutral. Kettlebell exercises build strength from this position, which transfers to almost everything we do.

Bill Campbell and William Otto discussed the pros and cons of kettlebell training. While it helps people perform functional movements, there is little evidence that it is superior to other strength-training techniques. Also, many people perform kettlebell exercises improperly, which could cause serious back and shoulder injuries. It is not the only way to improve strength and fitness, but it is fun and effective and is a powerful tool in your training arsenal. (Strength and Conditioning Journal, 35(5): 27-28, 2013)

## HIIT PLUS WEIGHT TRAINING IMPROVES AEROBIC CAPACITY AND STRENGTH

A series of studies since the 1980s has shown that aerobic training interferes with strength when strength and aerobic programs are practiced simultaneously. However, Greg Cantrell and colleagues from the University of Oklahoma found that practicing high-intensity interval training (HIIT) with weight training improved maximal oxygen consumption by nearly 10 percent and upper and lower body strength. A similar study by Mike Smith and co-workers showed that CrossFit training, involving high-intensity resistance training and aerobics, also caused positive changes in aerobic capacity, strength and body composition. (European Journal of Applied Physiology, published online January 5, 2014)



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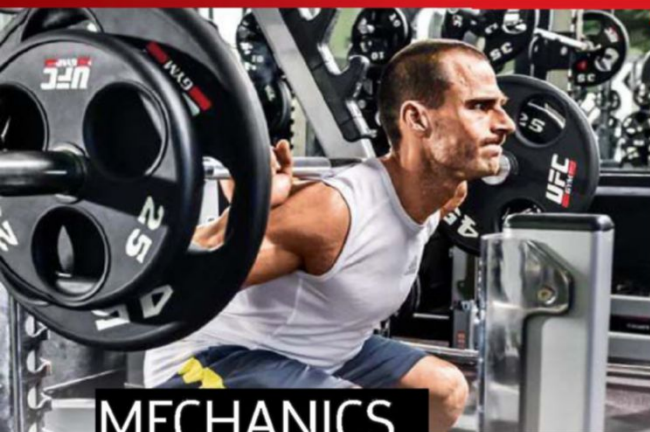
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## MECHANICS DETERIORATE DURING HIGH-REP SQUAT WORKOUTS

Cross-training workouts are extremely popular. These programs typically involve performing high reps of three to five exercises as explosively as possible. The safety of these programs has been questioned because form usually breaks down with fatigue, which increases the risk of injury. A University of Connecticut at Storrs study led by David Hooper and Bill Kraemer found that squat biomechanics deteriorated during a 55-rep squat workout. Hip involvement decreased with fatigue, which placed greater loads on the knee joint and spine. These changes diminish the training effect of the exercise and increase the risk of injury.

The safety of squats has been questioned for more than 50 years. **The National Strength and Conditioning Association, in a position stand, stated that squats are safe if performed correctly.** Clearly, technique breaks down during high-rep squat workouts, which place the spine and knees at risk and reduces the effectiveness of the exercise for building lower body strength. (Journal Strength Conditioning Research, 28: 1127-1134, 2014)

## Training for Endurance and Strength

Thirty years ago, scientists determined that simultaneously training for strength and endurance interfered with muscle hypertrophy and strength. Researchers have argued about this since then. Riki Ogasawara from the University of Tokyo and colleagues, in a study on rats, determined that endurance and strength exercise activate different biochemical pathways in the cells. Strength training activates the mTOR pathway, which promotes muscle protein synthesis. Endurance training turns on the AMPK pathway, which increases the activity of mitochondria—the powerhouses of the cell. **The researchers found that when doing endurance and strength training in the same workout, signaling for the second type of exercise would predominate.** So, if your goal is to build muscle and strength, practice strength training after endurance training. If your goal is to build endurance, practice endurance exercise second. This study has important implications for all athletes. (American Journal of Physiology Endocrinology Metabolism, published online April 1, 2014)

## ARE INCREASED ANABOLIC HORMONES DURING TRAINING NECESSARY FOR MUSCLE GROWTH?



Anabolic hormones such as testosterone, growth hormone, and IGF-1 trigger protein synthesis. Many recent studies on muscle physiology have tried to determine the optimal combination of sets, repetitions and rest between sets and workouts that will boost anabolic hormones. They also study supplements and dietary patterns that can increase these hormones. Daniel West and Stuart Phillips from McMaster University in Canada concluded that post-exercise increases in anabolic hormones do not promote muscle hypertrophy. Studies should concentrate on training methods that increase muscle size and strength rather than measuring changes in anabolic hormones that presumably increase them. (Medicine Science Sports Exercise, 45: 2044-2051, 2013)

## GLUTE-HAM RAISE AND DEADLIFTS BEST HAMSTRING EXERCISES

The hamstrings are made up of three muscles on the back of the thigh that flex the knee and extend the hip. Injuries to these muscles are extremely common and can end sports careers. The leg curl, involving knee flexion, is the most common and popular hamstring exercise. However, hamstrings are more heavily used as hip extensors in sport. Also, hamstring injuries commonly occur during hip extension. A study from the University of Memphis, led by Brian Schilling and Matt McAllister, showed that the glute-ham raise and Romanian deadlift were the best exercises for activating the hamstring muscles. These exercises are relatively uncommon, but essential for building hamstring strength and power and preventing injury. (Journal Strength Conditioning Research, 28: 1573-1580, 2014)





Best  
OF  
2014

## Gut Microbes Might Cause Low-Grade Inflammation and Obesity

Obese and lean humans have different gut microbe populations, which might account for individual differences in weight gain and low-grade inflammation. The human gastrointestinal tract contains more than 100 trillion microbes. Imbalances in gut microbes have been linked to obesity, inflammation, immune system breakdown, bad breath, gum disease, coronary artery disease, cancer, back pain, allergies and autism—according to a literature review by Giovanni Tarantino from the Federico II University Medical School in Naples, Italy. Bacteria-laden foods called probiotics, containing bacteria such as *Lactobacilli acidophilus* and *Bifidobacteria*, may be the next big health food craze because they stabilize the microbe population in the gut. (Journal Clinical Endocrinology Metabolism, 99: 2343-2346, 2014)

## SLEEP IN A COLD ROOM to Increase Brown Fat Activity

Brown fat (adipose) is a metabolically active tissue that dissipates energy as heat rather than storing it as fat. It helps humans acclimatize to cold, and may be critical for weight maintenance. Researchers from the National Institutes of Health, led by Francesco Celi and Paul Lee, found a novel way of turning on brown fat and increasing caloric expenditure: sleep in a cooler room. Five men slept in one-month blocks at room temperatures varying between 66 and 81 degrees. Sleeping in the cold room doubled brown fat activity and improved insulin sensitivity and blood sugar regulation. Sleeping in a slightly cooler room might be an effective way to increase metabolism and promote weight loss. (Diabetes, Published Online June 22, 2014)



## ALTITUDE Promotes Weight Loss

Living at altitude prevents obesity—according to a study led by Jameson Voss of the U.S. Air Force School of Aerospace Medicine at Wright-Patterson Air Force Base in Ohio. Obesity was 41 percent less likely in people stationed at high altitudes above 6,400 feet compared to people stationed below 3,200 feet. Obesity rates decreased with increasing altitudes, which means that altitudes of 9,000 feet (Aspen, Colorado) would be more effective for preventing obesity than 6,400 feet (Squaw Valley, California). Studies conducted at a laboratory on Pikes Peak, Colorado (14,110 feet) by George Brooks from the University of California, Berkeley showed that altitude decreases appetite and slows nutrient absorption in the gut. (PLOS ONE, 9(4): e93493, 2014)



## NITRIC OXIDE PROMOTES WEIGHT CONTROL

Nitric oxide (NO) is a chemical produced by the inner lining of the blood vessels that regulates blood flow. NO metabolism is regarded as one of the best markers of metabolic health and is critical for disease prevention, sexual performance and longevity. A review of literature by Brian Sansbury and Bradford Hill from the University of Louisville concluded that NO is critically important for the regulation of body fat, obesity and insulin metabolism. NO is involved in appetite control, blood sugar regulation, inflammation, regulation of fat synthesis and breakdown, and the production of blood sugar in the liver. Regular physical activity is the most important lifestyle factor enhancing the production of nitric oxide in the body. (Free Radical Biology and Medicine, 73: 383-399, 2014)





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*This stuff is great. I've been taking this for almost a month and have gotten stronger in almost all of my training! I added 6 pull-ups to my max and surprisingly increased my 1-rep max for squats.*  
– jdsnyds, Hermosa Beach, CA  
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## THE SKINNY ON BMI

Body mass index (BMI) is a measure of body-weight that is useful for classifying the health risks of bodyweight. Body mass index is based on the concept that weight should be proportional to height. BMI is a fairly accurate measure of the health risks of bodyweight for average (non-athletic) people, and it is easy to calculate and rate ( $BMI = \text{weight (kilograms)} / \text{height}^2 \text{ (meters)}$ ). Because BMI doesn't distinguish between fat weight and fat-free weight, however, it is inaccurate for some groups. For example,



athletes who weight train have more muscle mass than average people and may be classified as overweight by the BMI scale. Because their "excess" weight is in the form of muscle, however, it is healthy. Further, BMI is not particularly useful for tracking changes in body composition—

gains in muscle mass and losses of fat. Women are likely to have more body fat for a given BMI than men. BMI measurements have also over- and underestimated the prevalence of obesity in several ethnic groups.

If you are an athlete, a serious weight trainer or a person of short stature, do not use BMI as your primary means of assessing whether your current weight is healthy. Instead, try simple methods for measuring body fat such as bioelectrical impedance or skinfold testing. (The New York Times April 15, 2014)

## HIIT Reduces Food Intake

Exercise usually increases appetite and food intake. That's not true of high-intensity interval training (HIIT). A study on obese men from the University of Western Australia showed that HIIT reduced post-exercise food intake for 38 hours compared to a moderate-intensity (60 percent of maximum effort) workout. Following HIIT, test subjects had lower levels of ghrelin, a gut hormone that increases appetite. The men tolerated HIIT well. This type of training might be appropriate for people with limited time for exercise or those who want the workouts to end sooner. However, HIIT is not for everyone because it is extremely strenuous. (International Journal Obesity, published online July 9, 2013)

## TURN UP YOUR BROWN FAT FURNACE

The human body contains small amounts of a calorie-burning tissue called brown fat (brown adipose tissue, BAT) that converts food energy directly into heat. White fat does the opposite—it stores energy. Brown fat accounts for as much as 10 percent of the fat mass in people living in cold climates, such as northern Finland. Individual differences in BAT content and activity plays an important role in human obesity. Energy metabolism works through a series of coupled reactions. This means that energy released by breaking down fats, carbohy-

drates and proteins is captured in other reactions, such as making ATP (a high-energy chemical) or storing fats and carbohydrates. Uncoupling occurs when the energy from food breakdown is released as heat instead of capturing it as ATP. Brown fat converts food energy directly into heat. Drug and supplement makers, such as Advanced Molecular Labs with the product Thermo Heat, are targeting uncoupling in brown fat and other cells to increase metabolic rate, which will help people control body fat. (Journal Internal Medicine, doi: 10.1111/joim.12255, 2014)

## CAPSAICIN Makes You Feel Full

Capsaicin is a chemical found in red chili pepper used to make paprika, which is a spice used in chili and Mexican food. It reduces appetite and calorie intake and helps promote weight loss by releasing serotonin, a hunger-suppressing hormone, in the gut. A study from Maastricht University in the Netherlands found that supplementing capsaicin increased satiety and fullness and prevented overeating in people in energy balance (balance between calories in and calories out). Capsaicin also decreased the desire to eat after dinner during caloric restriction. While we have little information about the long-term effects of capsaicin, it appears to decrease appetite, reduce caloric intake and increase metabolic rate. (Appetite, 77: 46-51, 2014)







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## ARE YOU OVERTRAINED?

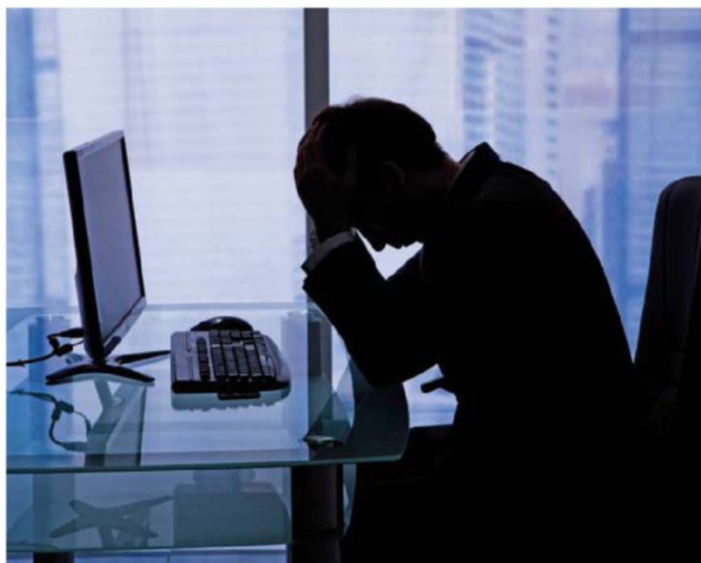
Overtraining is an imbalance between training and recovery. The consequences of this condition can be severe and include decreased performance, injury, depressed immunity and psychological depression. Overtraining is a natural hazard of competitive sports. Coaches and athletes, in their quest for better performance, undertake intense training programs in the hope of gaining an edge over the competition. However, a fine line exists between programs that improve condition and those leading to overtraining. **Training programs must be intense enough to improve fitness and skill, yet provide enough rest to ensure adequate recovery.** Diagnosis and treatment of overtraining is as much art as science. (Current Sports Medicine Reports, 13 (1): 45-51, 2014)

## Lifelong Exercise Prevents Muscle Wasting in Old Age

People lose about 20 percent of their muscle mass between ages 40 and 60. By age 70, muscle mass decreases by 40 percent and strength by 30 percent. Loss of muscle mass is called sarcopenia, which can result in diabetes, falls and injuries, muscle and joint pain, bone loss and decreased quality of life. Lifelong exercise can prevent this. Scientists from New Zealand and Australia, in a study on mice, showed that a lifetime of physical activity in animals produced higher levels of the anabolic hormone IGF-1, and the animals had more muscle mass throughout life. Exercise could be the Fountain of Youth. (Scandinavian Journal Of Medicine & Science In Sports, published online March 20, 2014)

## INTENSE EXERCISE Improves Blood Sugar Control

Obesity and physical inactivity promote insulin resistance, which is linked to high blood pressure, type 2 diabetes, abnormal blood fats, abdominal fat deposition and blood clotting abnormalities. Insulin resistance is epidemic in the United States, particularly in the South and Midwest. Exercise improves insulin sensitivity and blood sugar control. A University of Virginia study led by Art Weltman found that a single bout of intense exercise improved blood sugar control better than moderate-intensity exercise or no exercise. The study examined prediabetic adults and showed the importance of regular intense exercise for promoting metabolic health. (Journal of Clinical Endocrinology Metabolism, 99: 220-228, 2014)



## LONG WORK HOURS AND INADEQUATE SLEEP LINKED TO HEART ATTACKS

Men who work more than 60 hours per week and sleep less than six hours per night increase their risk of heart attack by 220 percent— according to a study from National Taiwan University in Taiwan. The study compared 322 men with heart attacks against similar healthy men in the population. Factors such as smoking, body mass index, and work environment did not influence the results. The take-home message is that working too many hours or not getting enough sleep can kill you. (Cardiology, published online December 27, 2013)

## ROTATOR CUFF TEAR IN ONE SHOULDER INCREASES THE RISK OF INJURY TO THE OTHER SHOULDER

The shoulder rotator cuff is responsible for internal and external rotation of the shoulder and for shoulder stability. Rotator cuff tears are extremely common in athletes. Bad bench press technique, for example, is a common cause of rotator cuff injuries. **A study from University Hospital in Münster, Germany showed that people who injure the rotator cuff in one arm have an 68 percent higher risk of injuring the rotator cuff in the other arm.** Shoulder function in the uninjured arm is diminished, even if the rotator cuff is not injured. People recovering from a rotator cuff injury in one arm should have their uninjured shoulder evaluated thoroughly. (The American Journal of Sports Medicine, 42: 826-830, 2014)



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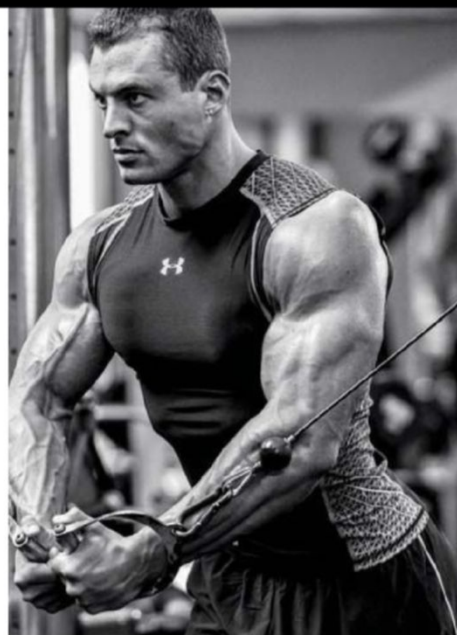




## Exercise Prevents Chronic Low-Grade Inflammation

Inflammation is the immune system's way of dealing with trauma, bacterial and viral infection, and irritants. Symptoms include pain, increased temperature or redness, swelling and loss of function. Most athletes are familiar with acute inflammation when they get a sprained ankle or torn hamstring. Chronic inflammation, on the other hand, is a prolonged, abnormal process that causes tissue breakdown and diseases such as atherosclerosis, cancer and rheumatoid arthritis.

**A review of literature by Robert Buresh from Kenesaw State University and Kris Berg from the University of Nebraska at Omaha concluded that moderate-intensity exercise can reduce chronic inflammation and improve metabolic health.** Exercise promotes body fat control and reduces the production of immune system cells associated with inflammation. Overtraining, on the other hand, can increase inflammation. The average person should approach exercise like Goldilocks: too little promotes chronic inflammation; too much also promotes chronic inflammation; regular, moderate-intensity exercise is just right. (Strength and Conditioning Journal, 36 (4): 87-93, 2014)



## INTENSE TRAINING LINKED TO RHABDOMYOLYSIS

Intense training methods such as cross training and boot camp training also increase the risk of severe muscle injury that can be debilitating or even life threatening. Overzealous cross trainers may develop rhabdomyolysis (rhabdo), which involves destruction of muscle tissue that results from the release of the muscle cell contents into the bloodstream. Toxic chemicals include myoglobin, creatine kinase, potassium, lactate dehydrogenase, uric acid, calcium, aspartate transaminase, alanine transaminase and phosphorus. The incidence of rhabdo has increased alarmingly with the popularity of high-intensity training programs. **Approximately 3 percent of people involved in physical training programs for the military, police and firefighters experience rhabdo.** Physicians across the country have reported an increased incidence in ordinary people performing extreme physical training programs in health clubs. The exact percentage is unknown, but experts believe that the incidence is underreported. (Current Sports Medicine Reports, 13: 113-119, 2014)

## SLEEP APNEA Linked to Cardiac Sudden Death

Sleep is critical for learning, focus, reaction time, metabolic control and bodyweight management. Lack of sleep triggered by sleep apnea can kill you. Sleep apnea is caused by airway obstruction during sleep, which disturbs sleep patterns and prevents deep sleep. Sleep apnea is linked to chronic inflammation and high blood pressure, both of which increase the risk of heart attack and stroke. Weight loss and the use of continuous positive airway

pressure (CPAP) reduce blood pressure and C-reactive protein, a marker of inflammation. Large neck muscles increase the risk of sleep apnea, so most bodybuilders are at risk. You might have sleep apnea if you snore or are chronically tired and fatigued during the day. See your physician if you suspect you might have sleep apnea—it might save your life. (New England Journal of Medicine, 370: 2339-2340, 2014)

## Is NAPROXEN Safer Than Other NSAIDs?

Regular use of nonsteroidal anti-inflammatory drugs (NSAIDs) has been linked to an increased risk of heart attack. However, recent large population studies have found that naproxen (Aleve) is safer than other NSAIDs. **The Drug Safety and Risk Management Advisory Committee of the U.S. Food and Drug Administration (FDA) concluded that naproxen was safer than other NSAIDs. This caused a controversy in the medical community.** Critics of the advisory committee's position cautioned that we have limited data on the safety of naproxen compared to other NSAIDs. People should not overuse these drugs because of the possibility of increased cardiovascular risk. (Medscape, February 11, 2014)





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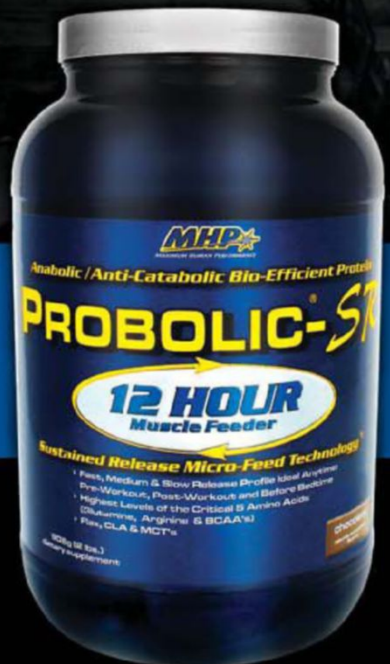
  
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\*Reidy, P.T., et al., Journal of Applied Physiology, April 3, 2014.

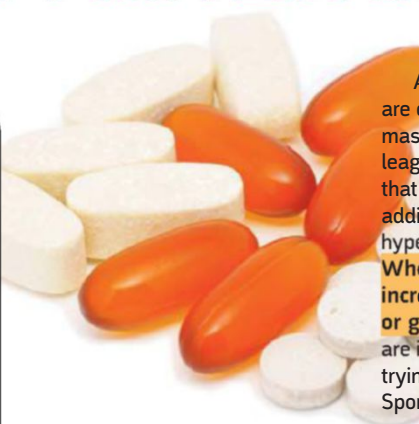
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# WHEY PROTEIN SUPPLEMENTS

## Boost Key Amino Acids



Amino acids such as leucine, isoleucine and valine are critical for protein synthesis and maintaining muscle mass, particularly in older adults. Scott Forbes and colleagues from the University of Alberta in Canada found that supplementing the diet with whey protein triggered additional increases in amino acids critical for muscle hypertrophy and the maintenance of muscle mass. **Whey promoted anabolic metabolism without increasing glucose, insulin, testosterone, cortisol or growth hormone.** Daily whey protein supplements are important for weight training and for older adults trying to prevent muscle loss. (International Journal Sports Nutrition Exercise Metabolism, 24: 188-195, 2014)

## The Health Benefits of Wild Rice

Wild rice is a popular food in East Asia and is gaining a foothold in the United States. It is high in vitamins, minerals, protein, starch, fiber and antioxidants. The U.S. Food and Drug Administration (FDA) recognizes it as a whole grain. A review of literature by scientists from the University of Manitoba in Canada concluded that wild rice, when consumed as part of a healthy diet, contributes to health by supplying antioxidants, reducing blood fats and supplying a good source of fiber. **Wild rice has a greater antioxidant capacity than the same amount of white rice.** In animal studies, long-term consumption of wild rice reduced the risk of cardiovascular disease. Wild rice is a heart-healthy food. (Nutrition Reviews, 72:227-236, 2014)



## HIGH RED MEAT INTAKE

### Linked to Low Sperm Counts

A Harvard School of Public Health study led by Myriam Afeiche found that consuming processed meats was linked to reduced sperm counts and abnormalities in sperm size and shape compared to men who ate less processed red meat. Sperm quality is directly related to fertility—the capacity to trigger pregnancy. Researchers found that eating fish was linked to better semen quality. The results were not linked to the intake of total fat or saturated fat. This study did not show that eating processed red meat caused fertility problems—only that they were associated. (Epidemiology, 25: 323-330, 2014)



## PROTEIN AND RESISTANCE TRAINING Combine to Boost Muscle Growth

New techniques using radioactive tracers, CT scans and MRI showed scientists the precise ways in which the cells make new muscle proteins and uncovered the secrets of muscle growth. **Muscle cells go into overdrive to make new proteins following meals high in proteins and amino acids.** The amino acid leucine is an important nutrient that promotes protein synthesis in your muscles. Leucine activates the mTOR pathway, which triggers muscle growth, and serves as a building block for muscle protein synthesis. Combining whey and leucine supplements with resistance exercise promotes muscle protein synthesis and prevents atrophy. (Nutrition, published online January 10, 2014)





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## CHERRY JUICE Reduces Inflammation and Muscle Damage

Cherry juice is the real deal for protecting muscle tissue from damage during intense exercise ranging from marathons to monster weight-training workouts—according to a review of literature by Stella Lucia Volpe from Drexel University in Philadelphia. **Chemicals in cherry juice, such as flavonoids and anthocyanins, prevent muscle oxidative damage and inflammation associated with exercise recovery.** Cherry juice, which reduces exercise-induced muscle damage, inflammation and oxidative stress, might be useful for reducing sports injuries and promoting recovery. (ACSM's Health & Fitness Journal 18(1): 32-33, 2014)

## VITAMIN D PROMOTES MUSCLE FUNCTION

Vitamin D is synthesized in the body in a reaction involving sunlight. Vitamin D can also be consumed in the diet by eating fatty fish, mushrooms and supplements. **Several recent studies have linked low vitamin D levels to poor bone health, muscle weakness and deficiencies in reproductive hormones.** However, the only health claims allowed by government agencies in the United States, Europe and Canada for vitamin D include reducing the risk of osteoporosis, preventing inflammation and promoting normal muscle function. A review of literature by Rachele Pojednic and Lisa Ceglia from Tufts University in Boston reported that lower blood levels of vitamin D were linked to lower aerobic capacity and higher body mass index. Vitamin D activates genes and cell-signaling chemicals that are critical for muscle hypertrophy, strength and improved muscle performance. In older adults, maintaining adequate vitamin D levels might contribute to fewer falls. (Exercise Sports Science Reviews, 42: 76-81, 2014)

## EAT PROTEIN THROUGHOUT THE DAY

The recommended daily allowance for protein is 0.8 to 1.5 grams per kilogram of bodyweight. Most people consume more protein at night than during the day. This is a mistake—according to a study led by Douglas Paddon-Jones and Madonna Mamerow from the University of Texas Medical Branch at Galveston. They found that 24-hour protein synthesis was higher when protein was consumed evenly throughout the day than when it was consumed more at night. This study used sophisticated radioactive tracer methods to measure protein synthesis. Strive to consume protein throughout the day and not just in the evening. (Journal of Nutrition, 144: 876-880, 2014)

## MEDITERRANEAN DIET *Helps Moderate* *Abdominal Fat Deposition*

Abdominal fat deposition is linked to heart attack, stroke and some types of cancer. It is so common in men and women that it is considered an inevitable part of getting older. **Spanish researchers found that people who followed a Mediterranean diet showed less abdominal fat gain during a 10-year study.** The Mediterranean diet is high in fruits, vegetables, olive oil, fish, poultry and lean meats. The study examined metabolic changes in more than 3,000 men and women between 2000 and 2009. People who followed the diet most had the lowest increases in abdominal fat. (British Journal of Nutrition, 111:1481-1487, 2014)





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## Beta-Alanine Reduces Muscle Lactate Buildup During HIIT

Alanine is an amino acid that provides energy during exercise and prevents neuromuscular fatigue by increasing tissue carnosine levels. Carnosine is an important antioxidant that protects cells from destruction and buffers acids that cause fatigue. Swiss scientists found that supplementing beta-alanine before a high-intensity interval training workout (HIIT) had no effect on blood buffering capacity or glycogen storage, but reduced muscle lactate by 23 percent. Taking beta-alanine supplements before HIIT might improve the quality of workouts. (European Journal Applied Physiology, published online Nov 9, 2013)



HMB (beta-hydroxy-beta-methylbutyrate) is a metabolite of the amino acid leucine. HMB prevents protein breakdown and promotes muscle hypertrophy. It also increases fat-free weight (mainly muscle) and decreases fat. ATP (adenosine triphosphate) is a high-energy chemical that participates in most cellular energy reactions. A study led by Jacob Wilson from the University of Tampa found that a supplement containing HMB and ATP administered daily during a 12-week study increased lean mass by 12.7 percent, strength by 23.5 percent, vertical jump by 21.5 percent and Wingate power (sprint exercise on a stationary bike) increased by 23.7 percent. The test subjects were involved in a high-intensity fitness program, during which two weeks were devoted to an intense program designed to create maximum fatigue. The experimental group continued to make gains during this difficult period. The study showed that HMB plus ATP is an effective performance-enhancing supplement. The study could have been improved by also measuring the effects of HMB and ATP separately. The researchers can do this at another time. (Journal Strength Conditioning Research, published online April 2014)

## VITAMINS C and E Reduce Adaptations to Endurance Training

Endurance training increases muscle cell mitochondria (the powerhouses of the cell), running speed and maximal oxygen consumption. An 11-week Norwegian study of 54 fit men and women showed that supplementing vitamin C (1,000 milligrams per day) and vitamin E (235 milligrams per day) blunted increases in mitochondria protein that usually accompany endurance training. However, the supplements did not impair maximal oxygen consumption or running speed during the experiments. Endurance, the capacity to sustain exercise intensity, is highly related to mitochondrial content but only moderately related to maximal oxygen consumption. Long-term consumption of vitamin E and C supplements could eventually decrease endurance capacity. Antioxidant supplements could interfere with endurance training gains. (Journal of Physiology, published online February 3, 2014)

## NITRATES HAVE SMALL EFFECT ON ENDURANCE PERFORMANCES

Nitrates promote endurance performance slightly—according to a literature review and meta-analysis by researchers from the University of Sydney in Australia. The blood vessels use nitrates in food such as beetroot to produce nitric oxide—a critical chemical that promotes blood flow, improves sexual performance and enhances energy levels. The capacity of the endothelial cells (cells lining the blood vessels) to secrete nitric oxide is an important measure of cardiovascular health and performance. Healthy blood vessels secrete nitric oxide, which promotes blood flow to tissues throughout the body. Nitrates from food sources such as processed meats might increase the risk of cancer, so it's probably best to consume nitrates and nitrites from vegetable sources rather than from hot dogs or bologna. (International Journal of Sport Nutrition and Exercise Metabolism, 23, 522-532, 2013)





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● BY STEVE BLECHMAN AND

# CREATINE

## Promotes Multi-Workout Recovery

Restoration is critical to any effective training program. Successful athletes train hard, recover, and train hard again. Recovery rates differ between individuals. Slowly recovering athletes are prone to injury, overtraining and slow progress. Creatine monohydrate might help the restoration process. Kelle Veggi from the University of Iguacu in Brazil and colleagues found that creatine supplementation blunted muscle soreness and creatine kinase—a marker of muscle damage, which promoted recovery from repeated bouts of exercise. Creatine boosts strength, power and muscle mass. It also promotes restoration for more steady training progress. (International Journal of Sport Nutrition and Exercise Metabolism, 23: 378-387, 2013)



## GREEN TEA EXTRACT MAY BE TOXIC TO THE LIVER

Green tea extract contains a chemical called epigallocatechin-3-gallate (EGCG) that promotes weight loss by boosting thermogenesis (increased calorie use) and curbing appetite. Green tea extract is a popular weight-loss supplement, but it could be toxic to the liver. A study on rats from the University of Arkansas for Medical Sciences found that in animals with abnormal mitochondria (powerhouses of the cells), EGCG caused swelling in the mitochondria. The researchers suggested that green tea extract could cause liver problems in people with abnormal mitochondria. Obese people often have poor metabolic health, so they might experience side effects from green tea extract when trying to lose weight. (Biochemical and Biophysical Research Communications, 443: 1097-1104, 2014)



## WHEY PROTEIN Plus Leucine Promotes Protein Synthesis In Older Adults

A supplement containing 20 grams of whey protein and three grams of leucine consumed after weight training was superior to an equal amount of milk protein for promoting muscle protein synthesis in older adults. Muscle loss, a condition called sarcopenia, is a significant health issue in older adults. **Sarcopenia interferes with mobility and quality of life, and decreases metabolic health by reducing one of the most active tissues in the body.** Overwhelming evidence shows that older adults can help maintain muscle mass by consuming a supplement containing 20 to 30 grams of whey protein and three grams of leucine at least once a day. (Nutrition Journal, 13:9, 2014)

# CAFFEINE

## IMPROVES PERFORMANCE BETTER DURING MORNING WORKOUTS

Consuming 200 to 400 milligrams of caffeine before training or sports competitions improves performance in endurance and high-intensity exercise. Caffeine is legal in Olympic sports but restricted in sports regulated by the National Collegiate Athletic Association (NCAA). **Spanish researchers from the University of Castilla-La Mancha in Toledo found that caffeine improved performance in the bench press and squat when taken in the morning but not the afternoon.** Caffeine is an important supplement for improving training intensity. It is more effective for morning than afternoon workouts. Consuming caffeine supplements in the afternoon was less effective and produced more side effects. (Journal of Science and Medicine Sport, published online April 26, 2014)







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## THE PENIS IS THE WINDOW TO THE HEART

Erectile dysfunction is an early warning sign of coronary artery disease. Problems with the small blood vessels in the penis show up earlier than problems with the larger blood vessels in the heart. Chinese researchers found that young men who had difficulty maintaining erections during masturbation had a higher risk of coronary artery disease than men with normal erections. Previously, scientists speculated that erection problems during masturbation were linked to psychological disturbances. Erectile dysfunction during masturbation was linked to problems with the cells lining the arteries (endothelial cells), insulin resistance, and other markers of blood sugar regulation problems. The penis is indeed a window to the heart. (Journal Sexual Medicine, 11: 1519-1526, 2014)

## Statins Improve ERECTILE DYSFUNCTION

Erectile dysfunction (ED) affects 30 million Americans and 150 million people worldwide. ED is typically caused by abnormalities in the blood vessels supplying the penis. Drugs like Viagra and Cialis are the first line of defense for treating ED. The problem is closely related to coronary artery disease and is an early predictor of heart attack. Statins are drugs used to lower cholesterol and treat primary risk factors of coronary artery disease. A study by researchers from Capital Medical University in Beijing, China found that statins improved ED compared to a placebo. Statins may reduce blood vessel disease, which could have a positive effect on the erectile capacity of the penis. (Journal of Sexual Medicine, published online March 13, 2014)

## THE AMERICAN PENIS Is In A Downward Spiral

Many men worry about the size of their penis, and maybe they should. A study from the Kinsey Institute for Research in Sex, Gender and Reproduction at the University of Indiana showed that penis size is smaller than in previous years. Ten years ago, a study by Lifestyles Condom company showed that the average man's erect penis was 5.877 inches long, with two-thirds falling between 5.1 and 6.2 inches. About 17 percent of men measured less than 4.5 inches. The penis size reported in the Lifestyle study was shorter than that found in the famous Kinsey report more than 60 years ago. The new Kinsey study showed that the average length was 5.57 inches, which is shorter than the Lifestyle Condoms study and shorter than the Kinsey study from 60 years ago. Is the American penis in a downward spiral or are the differences due to measurement variations? You be the judge. (Journal Sexual Medicine, 11:93-101, 2014)

## PSYCHOLOGICAL STRESS DAMAGES TESTICULAR CELLS

Chronic stress suppresses sexual desire and saps energy levels. Chinese researchers, in a study on rats, found that five weeks of chronic stress interfered with normal mating behavior and decreased the size and number of Leydig cells in the testes. Leydig cells produce testosterone when stimulated by luteinizing hormone. **Stress also caused abnormal sperm cells and decreased tissue density in the testes.** Chronic stress is bad for your sex life. It clouds the mind with worry and doubt, and triggers significant tissue damage in the testes. (Journal Sexual Medicine, 11: 653-663, 2014)







## CELL PHONE USE LINKED TO ERECTILE DYSFUNCTION

Cell phone use could damage male reproductive health— according to a study by researchers from the University of Graz in Austria. They found a link between the number of hours men carried active cell phones and the incidence of erectile dysfunction (ED). There was no link between cell phone talking time and ED or total testosterone.

**Other studies have found a link between cell phone use and reduced sperm quality and activity, and possibly cancer.** Carry your cell phone in a bag instead of your pocket. (Central European Journal Urology, 66: 75-77, 2013)

## VIAGRA INCREASES TESTOSTERONE LEVELS

Shalender Bhasin and colleagues from Boston University found that Viagra (sildenafil) increased testosterone levels by 20 to 30 percent. Testosterone might be at the heart of erectile dysfunction. **Viagra suppressed levels of the hormone LH, which showed that the drug influences the control mechanisms of testosterone metabolism.** Viagra also caused increases in estrogen and DHEA. The researchers suggested that low testosterone output from the testes is centrally related to erection problems in men. (Journal Sexual Medicine, 11: 616-623, 2014)



## VIAGRA INCREASES THE RISK OF MELANOMA

Melanoma is a deadly form of skin cancer that develops in the melanocytes— cells that give color to the skin. In 2014, about 76,100 people will be diagnosed with melanoma and 9,710 people will die from the disease. **Nearly 1,000,000 people in the United States have melanoma.** Previous severe sunburn and excessive use of tanning beds are leading risk factors of the disease. A Harvard Medical School study showed an 84 percent increased risk of melanoma in men who used of sildenafil (Viagra). In contrast, sildenafil was not related to the development of squamous cell cancer (a less dangerous type of skin cancer). (Journal American Medical Association Internal Medicine, 174: 964-970, 2014)

## A CIALIS A DAY KEEPS ED AWAY

Cialis has been called “the weekender” because it promotes erections for about 36 hours versus shorter-acting drugs such as Viagra. Many physicians are promoting daily use of Cialis (5 milligrams) to produce a more consistent erection and greater sexual satisfaction. Korean scientists from Korea University College of Medicine found that daily or alternate-day treatment with five milligrams of Cialis triggered equal improvements in erection quality, sexual performance and sex frequency. Compliance is a consideration. Some people have difficulty remembering to take their medications when they follow an irregular schedule. (International Journal of Impotence Research, published online July 3, 2014)

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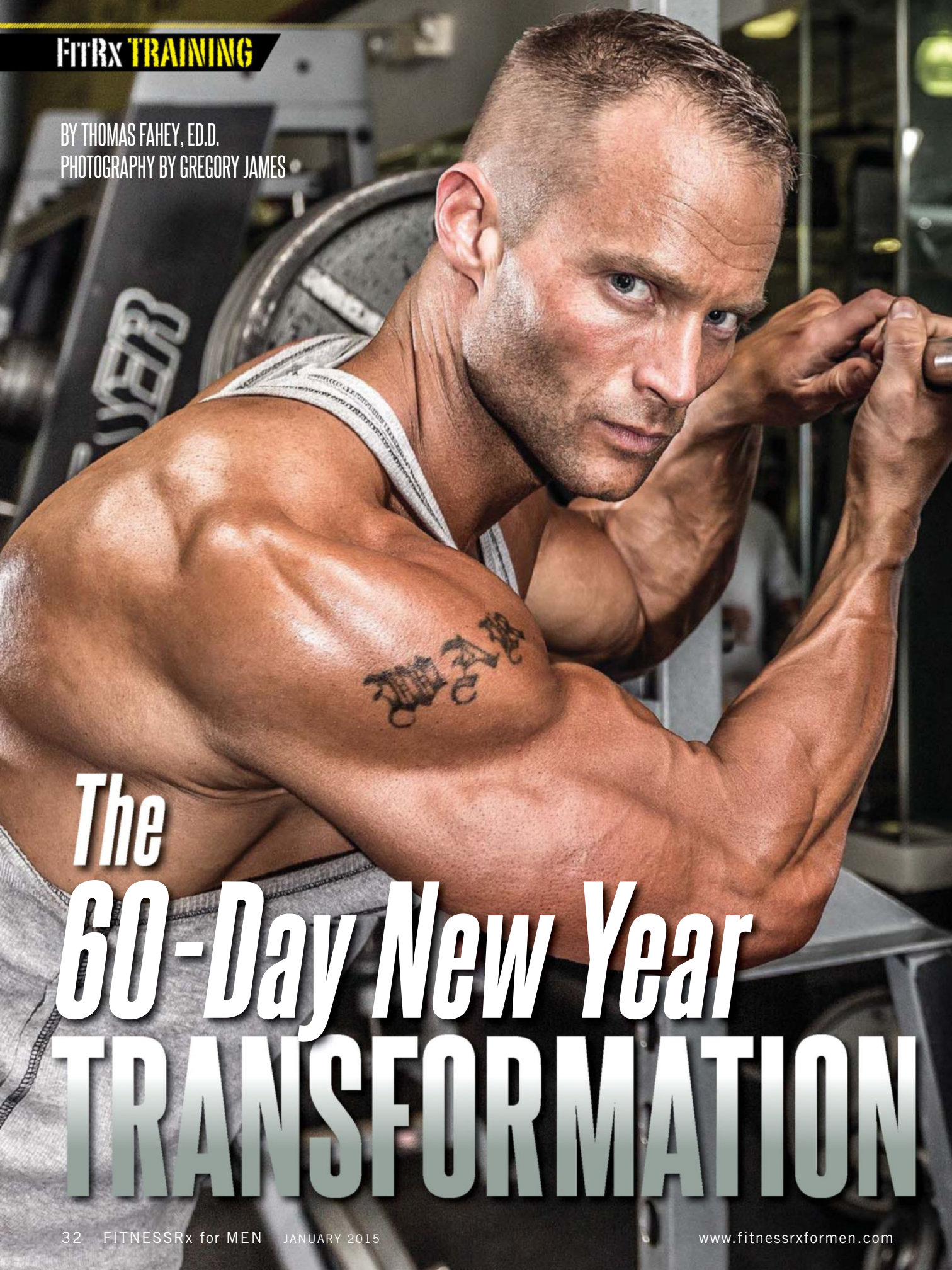
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BY THOMAS FAHEY, ED.D.  
PHOTOGRAPHY BY GREGORY JAMES



# *The* *60-Day New Year* **TRANSFORMATION**



# Incinerate Fat, Build Muscle, Look Awesome!



High-intensity, explosive training builds muscle power, core stability, strength and overall fitness in less than half the time of traditional methods. FitnessRx for Men presents the X-Plosive Total Body Workout (X-PT) that combines explosive weight training with high-intensity interval training (HIIT) to transform your physique in 2015. This revolutionary program will develop aerobic fitness, explosive muscle power and promote fat loss by training less than 60 minutes, three times per week. You will be in the best shape of your life in only two months. This seems crazy and impossible, but it works!

Muscles are highly adaptable, so almost any program that stresses them will cause some improvements in muscle strength and size. Some programs are better than others. Often, putting in long hours at the gym does not produce enough results to justify the effort. X-PT is a more effective alternative. High-speed training brings rapid results because it speeds communication between nerves and muscles, while overloading the fibers. X-PT creates more muscle tension than any other form of resistive exercise training. This program works, and we have the science to prove it.

## SCIENCE SUPPORTS THE X-PLOSIVE TOTAL BODY WORKOUT

An effective weight-training program should create high levels of muscle tension. High-speed, explosive training overloads the fibers and creates more muscle tension than any other form of training, yet few people incorporate it into their training programs. Many men spend hours in the gym doing the same old controlled-speed reps, yet have little to show for it. X-PT produces startling results in a fraction of the time. You work hard but you get in and out of the gym quickly and have something to show for your efforts.

X-PT applies scientific principles to bring quick results. It builds muscle strength and size rapidly, promotes fat loss, builds fitness quickly, activates anabolic hormones and creates long-term changes in the muscles that promote life-long fitness. X-PT activates a metabolic pathway called mTOR (mammalian target of rapamycin) that regulates muscle growth and repair. X-PT also maximizes the time the muscle tissue is under quality tension, which is vital for muscle hypertrophy. X-PT builds muscle satellite cells, which are genetic structures





## SQUATS

The technique: Place the bar on a squat rack. Facing the rack, place the bar on your shoulders and grasp it with your palms facing forward. Stand and take a step back and align your feet slightly wider than shoulder-width apart with toes pointed outward at a 45-degree angle. Squat down until your thighs are parallel with the floor. During the exercise, hinge at the hips, drive your thighs to the sides, keep your weight on your heels and chest out, and maintain a neutral spine and head. When you reach parallel, drive forward with your hips, keep your chest out and continue maintaining a neutral spine and head. Do this exercise as fast and explosively as you can during the active (pushing) phase of the lift, while maintaining good technique.

fast eccentric training was due to a greater amount of protein remodeling as a result of greater Z-band damage.

Damaged muscle cells create satellite cells during the repair process, which are muscle cells consisting of just a nucleus. Muscle growth factors can cause the satellite cells to combine with muscle cells that were stressed or damaged during training and assist in cell repair and adaptation. Satellite cell formation is important because it maintains a balance between the number of cell nuclei and cell mass, which is critical for protein synthesis and muscle cell repair. Also, increased satellite cell formation creates permanent changes in muscle cell control that makes it easier to regain losses following periods of inactivity. The new cell nuclei created from training enhance the cells' genetic capacity to make new protein. Thus, a man who spends many years building a 300-pound bench press will be able to get it back again quickly after deconditioning.

Following injury caused by weight training, muscle cells go into overdrive to make new proteins to repair the damage and strengthen muscle so they withstand future stresses. Measurable changes in muscle size take weeks. Why does it

that increase the ability of the muscles to make new proteins. X-PT triggers the release of growth hormone, IGF-1, testosterone, and epinephrine that streamlines the body by promoting muscle growth and reducing fat.

Quality is more important than quantity for building powerful, functional muscles and cutting fat. Recent studies from Canada and Brazil showed that explosive training activates more muscle fibers and improves muscle tone and shape rapidly. Brazilian scientists found that power training (lifting weights at fast speeds) is an effective method for increasing muscle mass, strength and power. They compared traditional tempo training (2-3 seconds concentric or push; 2-3 seconds eccentric or recover, with power training— 1 second concentric; 2-3 seconds eccentric). Increases in muscle power were three to four times greater in the power group than the traditionally trained group. Increases in muscle mass and strength were also best in the power-training group.

Canadian researchers, led by Tim Shepstone, found that high-speed training increased muscle cross-sectional area and the size of fast-twitch motor units (muscle fibers and their nerve) better than slow-speed training. High-speed explosive training accelerated fat loss and promoted muscle protein synthesis and caused larger increases in muscle mass and strength than traditional strength training. They did muscle biopsies that showed that high-speed training was best for increasing the size of fast-twitch muscle fibers and that it created the most damage to Z-bands— muscle fiber structures that are particularly susceptible to injury during weight training. Scientists believe that Z-band damage and repair is the major process involved in making muscles larger and stronger. They concluded that the greater hypertrophy seen from



## HEAVY BARBELL DEADLIFTS

This exercise involves lifting a barbell from the floor to waist level. Grip the barbell with palms facing toward you, squat down with your hips back (flexed) and weight on your heels, and arms straight; lift the weight by driving your hips forward and extending your knees with your back straight until you can stand upright with your shoulders back. Return the barbell to the starting position by flexing (bending) your hips and keeping your back straight. Hinge at the hips and not at the back during this exercise.





take so long? Muscle size reflects the balance between making new protein and breaking down old protein. Muscle breakdown accelerates after a heavy workout—often exceeding the rate of protein synthesis. Catabolic (breakdown) hormones, such as corticosteroids, and anti-growth factors, such as myostatin, speed the rate of muscle breakdown after exercise. Your goal is to speed the rate of muscle hypertrophy and slow the rate of muscle breakdown.

### KEEPING X-PT SAFE

High-speed, explosive training has a large potential for injury if you progress too rapidly. Combining high-speed movements and fatigue can cause muscle strains and joint injuries. Excessive loads can destroy muscle cells—a condition called rhabdomyolysis (rhabdo). Rhabdo causes the muscle cell contents to spill into the blood, which can cause kidney failure and death. Until recently,

rhabdo only occurred from extreme trauma or excessive military training. Rhabdo is occurring more frequently in recreational athletes because of the popularity of boot camp and cross training-type programs.

Start off with light weights and progress slowly. Don't practice X-PT more than three times a week. Also, incorporate all the elements that promote muscle hypertrophy, including adequate dietary protein and caloric intake, rest, hormone management, and training program structure.

Hard working muscles need rest and nutrition if they are to grow optimally. Consume a whey protein shake containing about 40 grams of protein immediately after training. Give the target muscles enough rest to recover before repeating high-speed training workouts. Practice this program three days per week and cut back on sets if you feel excessive fatigue and soreness.



**HIGH-SPEED TRAINING BRINGS RAPID RESULTS BECAUSE IT SPEEDS COMMUNICATION BETWEEN NERVES AND MUSCLES, WHILE OVERLOADING THE FIBERS.**

### HEAVY DUMBBELL BENCH PRESS

Sit on a flat bench holding a dumbbell in each hand on your knees. Rock back and hold the dumbbells at chest level. Your feet should be planted firmly on the floor, knees bent, and back and head on the bench. Push the dumbbells straight up from your chest and then return to the starting position.





## STANDING BARBELL MILITARY PRESS

Clean the barbell to chest level. Use good technique when cleaning the weight so that you don't injure your back. Push the barbell overhead. Return to the clean position. Do this exercise explosively, but maintain your spine in a tight and neutral position.

CANADIAN RESEARCHERS FOUND THAT SIX SESSIONS OF HIIT ON A STATIONARY BIKE INCREASED MUSCLE OXIDATIVE CAPACITY (CITRATE SYNTHASE) BY ALMOST 50 PERCENT, MUSCLE GLYCOGEN BY 20 PERCENT, AND CYCLE ENDURANCE

X-PT is a scientific breakthrough that will bring rapid results. You must use it sparingly and gradually to prevent injury. However, it adds a powerful tool to your training arsenal that will boost your fitness to the next level and separate you from the pack.

## COMBINE HIGH-SPEED EXPLOSIVE TRAINING WITH HIGH-INTENSITY INTERVAL TRAINING (HIIT)

Don't neglect aerobics in your fitness training. Unfortunately, many guys who like to pump iron hate aerobics. Let's face it—running on a treadmill or outdoor track for 60 minutes is boring and tedious and leads to pains in your knees, ankles, hips and back. High-intensity interval training (HIIT) is a good alternative. HIIT refers to repeated bouts of high-intensity exercise interrupted by rest. It meshes well with the weight training part of the program (X-PT) and uses the same training philosophy—train hard and explosively.

Short bouts of maximal intensity exercise build high levels of fitness quickly. Canadian researchers found that six sessions of HIIT on a stationary bike increased muscle oxidative capacity (citrate synthase) by almost 50 percent, muscle glycogen by 20 percent, and cycle endurance capacity by 100 percent. The subjects made these amazing improvements exercising a mere 15 minutes in two weeks. A follow-up study in moderately active women using the same training method showed that interval training increased whole-body and skeletal muscle capacity for fat use during exercise. The key element in both studies was training at 100 percent of maximum effort. These studies showed the importance of high-intensity training for building aerobic capacity and endurance.

The Canadian studies used four to seven repetitions of high-intensity exercise (30 seconds at 100 percent of maximum effort) on a stationary bike followed by four minutes rest between exercises. You can, however, use interval training for your favorite aerobic exercises, including ground or treadmill running, stair climbers, elliptical trainers, swimming or cycling.

Interval training builds muscle power that will carry over to your fitness and body-shaping program. The strong, shapely muscles you build doing intervals will make it easier to do leg exercises such as lunges and squats and give you greater stamina for sports. Intervals will also develop powerful lower body muscles faster and better than almost any other exercise.

## THE X-PLOSIVE TOTAL BODY WORKOUT

Perform this workout three days per week, resting at least one day between workouts. This workout includes one to three sets of 10 repetitions for barbell squats, heavy dumbbell deadlifts, heavy dumbbell bench press, standing bent-over rows with dumbbells, standing military press, standing with dumbbells overhead triceps extensions, standing dumbbells bicep curls, rope crunches (abs) and leg lifts. Rest one minute between sets. Do each repetition as fast and explosively as possible, but maintain good form. This means maintaining a neutral spine and not swinging the weights or flailing the body around during the exercises. Warm up before beginning the workout with some kettlebell swings.

Start with one set of each exercise and build up to three sets as fitness improves. The key to this workout is to train maximally. This means performing the exercises as quickly and explosively as possible. Increase weight



### STANDING DUMBBELL TRICEPS EXTENSION

Stand with a dumbbell pressed overhead. Keeping your elbow up, flex your arm until the dumbbell touches the back of your shoulder. Return to the starting position. You can do this exercise either with one or both arms at a time.



### STANDING BENT-OVER BARBELL ROWS

Stand next to a bench and bend over at the waist, supporting your weight while you hold a barbell. Pull up the barbell in a rowing motion and then lower it under control to the starting position.



### ROPE CRUNCHES (NOT PICTURED)

Attach the rope to the end of the lat machine pulley. Get on your knees holding the rope at chest level. Curl your trunk toward the ground and then return to the starting position. This exercise is not recommended for people with back problems.

### LEG LIFTS (NOT PICTURED)

Lie on your back with your hands placed under the small of your back. Lift your legs 90 degrees and then return to the starting position. This exercise is not recommended for people with back problems.

as you get stronger. Don't increase the weight so much that you can't move fast and complete the total workout.

Follow each high-speed weight training session with a high-intensity interval training program on an elliptical trainer, stationary bike, treadmill or arc trainer. Warm up for two to three minutes by exercising at a slow pace—approximately 50 percent of maximum effort. Sprint as fast as you can for 30 seconds, and then slow the pace to 30 to 50 percent effort for two to four minutes.



### STANDING BARBELL BICEPS CURLS

Keeping your elbows down, flex your arms and bring the barbell to your chest and then return them the starting position. Do this exercise explosively but do not rock your back to make the exercise easier.







**YOU WILL BE IN THE BEST SHAPE OF YOUR LIFE IN ONLY TWO MONTHS.**

## SAMPLE WORKOUT

Do this workout three days per week (for example: Monday, Wednesday, Friday). Do the high-intensity weight workout before interval training. For weight training, begin with one set of each exercise and progress to three sets. Do each exercise as quickly and explosively as possible, while maintaining good form. Use weights that allow you to complete each set explosively. Add weight as you get stronger.

Interval training: Do intervals on a stationary bike, arc trainer, elliptical trainer or treadmill. Warm up; exercise at maximum intensity for 30 seconds; recover with low-intensity exercise; repeat four to six times; cool down.

Then repeat the high intensity exercise for a total of four to eight times. Cool down for three minutes after completing the final interval. The exercise sequence looks like this: 1) Warm-up, 2) 30-second sprint, 3) Two to four minutes recovery at 30 to 50 percent effort, 4) 30-second sprint, 5) Two to four minutes recovery at 30 to 50 percent effort, 6) 30-second sprint, 7) Two to four minutes recovery at 30 to 50 percent effort, 8) 30-second sprint, 9) Two to four minutes recovery at 30 to 50 percent effort, 10) Cool down for three minutes. Each sprint should be at 100 percent effort. Increase the number of sprints as you become more fit.

EXERCISE	SETS	REPS	REST BETWEEN SETS
Squats	1-3	10	1 minute
Barbell deadlift	1-3	10	1 minute
Standing military press	1-3	10	1 minute
Standing bent-over rows	1-3	10	1 minute
Standing triceps extensions	1-3	10	1 minute
Standing barbell curls	1-3	10	1 minute
Rope crunches	1-3	10	1 minute
Leg lifts	1-3	10	1 minute
Dumbbell bench press	1-3	10	1 minute
High intensity interval training on arc, elliptical trainer stationary bike or treadmill	4-6	30-second sprints at 100 percent effort	2-4 minutes recovery at 30 to 50 percent effort

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# WHITNEY REID: My Workout and Diet Plan

BY LISA STEUER

In this feature, cover model Whitney Reid, the East Coast sales manager for BPI Sports, demonstrates one of his typical workouts that can be used for your own transformation. This workout includes bench, squats and deads because Whitney believes you can't build a complete physique without including those.

"These exercises also help me keep a detailed midsection without having to do much direct ab exercises, and if you keep the intensity up while training, cardio can be a minor aspect for great conditioning," he said. However, Whitney admits he actually enjoys cardio, but will do it more for stress relief rather than for his physique, and will sometimes do cardio every night of the week. As discussed in this feature, HIIT training is a great choice. "I'll do interval style training, sprints and active rest," said Whitney. "Joe Donnelly introduced me to 'deadmill' sprints (done with the treadmill turned off), which are a killer!"

As a former college football player, Whitney has always trained hard and intensely. But an injury (L5-S1 and C6-C7 tears), led him to focusing more on dropping body fat than adding size. But Whitney also said that his training never really changed *too* much. "I do, however, incorporate more volume training now, which I didn't in the past, but I still feel that core lifts, (bench, squat and deads) are the most important exercises in the gym."

When it comes to diet, Whitney has experimented with different styles over the past six years. Now he does everything in moderation and says that if he's craving a certain food, he'll have it. "When getting ready for this shoot, I took about four weeks and monitored my protein, fat and carb intake, but I didn't necessarily limit myself from anything. I kept my protein around 250 grams per day and my carbs around 200-300 depending on what I was training. One of my best friends, Kevin Dehaven (BPI national sales manager), helped me with my plan. There wasn't a day that I didn't eat out at my favorite restaurants here in South Florida while trying to be in my best shape for this shoot."



## SUPPLEMENT STACK

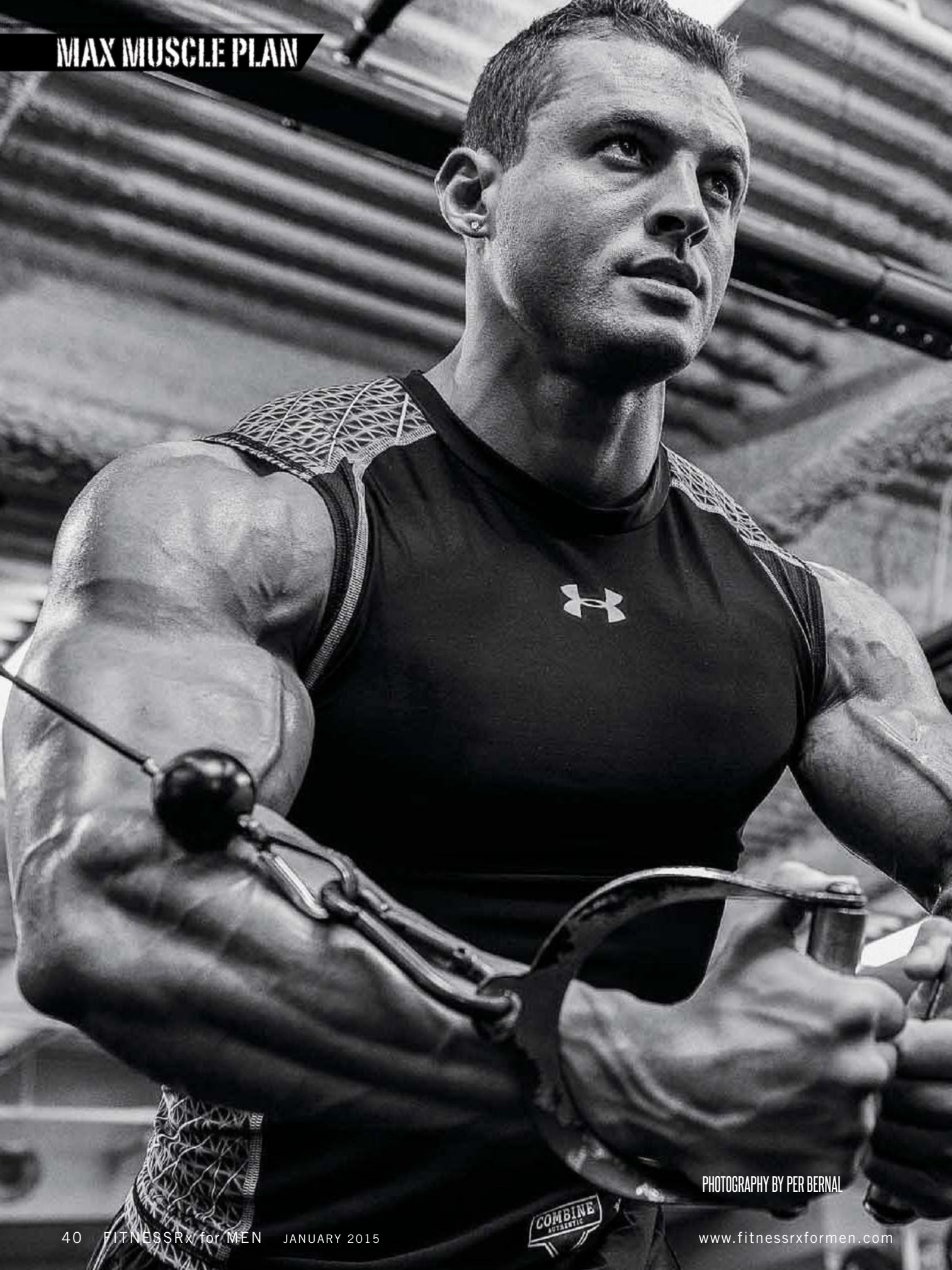
Whitney shares his go-to BPI Sports supplements for getting the most out of his workouts.

**1.M.R. Vortex.** "There are three types of pre workout 'types'— the pure stim, the pump/performance and the mental focus. I feel that Vortex is the best combination of the three. Drinking this 20-minute pre-workout combined with the agmatine in the Best BCAAs intra-workout will give you an insane pump."

**Best BCAAs.** "Training hard is great, but without rest and recovery, you will never achieve desired results. BPI Sports Best BCAAs is my go-to product for recovery. I actually drink several servings throughout the day (minimum of one scoop first thing in the AM, one scoop intra-workout and another post-workout). Best BCAAs is a great blend of oligopeptide-linked branched chains with added CLA and agmatine."

**Whey-HD.** "Obviously if you are reading this article you know the importance of a protein powder in your supplement plan. Over the many years of training and taking products, I can vouch for Whey-HD to be a great product that is easy on the stomach (no bloating and easily digested) and tastes amazing!"





PHOTOGRAPHY BY PER BERNAL



# ***The M.A.X.*** **MUSCLE** **PLAN**

**Complete Training and  
Nutrition Program for Building  
Your Best Body Ever**

Looking to jumpstart the New Year with a new body? If so, you're in luck. This article will provide you with a complete blueprint—both training and nutrition—to achieve your best shape ever in just 12 weeks.

It's a modified version of my popular hypertrophy program, "The M.A.X. Muscle Plan," created specifically for FitnessRx for Men readers. Follow the program as outlined and you'll transform your physique by the time spring rolls around. All you need to do is provide the dedication and effort and results are all but guaranteed!

## **TRAINING PROGRAM**

The M.A.X. training program employs a concept called "block periodization." For the purposes of this program, both volume and load are manipulated over the three-month time period with each month representing a specific training block. Volume is perhaps the most important factor in maximizing muscular gains. A clear dose-response relationship has been shown to exist between volume and hypertrophy; increasingly greater workloads are associated with increasingly greater growth, at least up a certain point.<sup>1,2</sup>

Bottom line: if your goal is to maximize muscle development, you need to train with high volumes.

That said, training with high volumes for prolonged periods is bound to overtax your body's resources and ultimately lead to an overtrained state. It's therefore best to progressively increase training volume over time, culminating with an overreaching phase that pushes your body to the edge without going over the cliff. To accomplish this task, increases in volume will be facilitated by greater weekly training frequencies. Frequency will increase from three days a week in Block One to four days a week in Block Two and then to six days a week in Block Three. You'll perform two to three exercises per muscle group of two to four sets per exercise.

Larger muscle groups like the back and quads will get more overall volume while the smaller muscles of the arms and calves will receive less total work.

With respect to loading, the program will focus on a repetition range of six to 12 reps per set. This so-called "hypertrophy range" provides an ideal combination of high mechanical tension and metabolic stress—two factors that have been shown to synergistically promote muscle growth.<sup>3,4</sup> A strategy called "step loading" will be employed whereby loads are progressively increased over the first three weeks of each block. In week one you'll perform 10 to 12 reps, week two will be eight to 10 reps, and week three will be six to eight reps. The last set of each exercise **should be taken to concentric muscle failure—i.e., the inability to perform an additional rep in good form**; all other sets should be sufficiently challenging so that you stop a rep or two short of failure. Rest intervals should last approximately one to two minutes between sets. Relatively short rest periods enhance metabolic stress, which can translate into greater gains.<sup>4</sup>

Every fourth week will be a "deload" phase where both volume and load are systematically decreased. Here the goal is to rejuvenate your resources so that you don't end up overtrained. You'll work out only twice per week during each deload phase, performing three sets of ~15 reps on a total body routine (one exercise per major muscle group). Sets should be stopped several reps short of failure; remember, you're not trying to push yourself to the limit during this phase, but rather to facilitate recovery.

An important component in any muscle-building program is exercise selection. Muscles have varied attachments that help to optimize leverage in carrying out different joint actions.<sup>5</sup> Moreover, muscle fibers are arranged in an array of patterns and often do not span the entire length of the muscle.<sup>5</sup> These factors emphasize the need to vary the exercises used over the course of the program to ensure that all fibers are optimally stimulated—a



# MAX MUSCLE PLAN

prerequisite for maximal growth. You should aspire to work muscles in multiple planes of movement using multiple modalities. Alter training angles when possible. Vary hand spacings and foot stances, as well. There are no specific rules as to how often you should mix things up, but changing movements every four weeks or so—in this case every training block—is a sound strategy.

## BLOCK ONE

Block One is a three-day-a-week total body routine allowing at least 48 hours rest between workouts (i.e., Monday, Wednesday, Friday). You'll perform one exercise for each of the major muscle groups per session. Table One summarizes the protocol for Block One and Table Two provides a sample routine.

**TABLE 1: PROTOCOL FOR BLOCK 1**

DAY	MUSCLE GROUPS	REPS	REST INTERVAL
1	Workout 1: Total Body	Week 1: 10-12 Week 2: 8-10 Week 3: 6-8	1-2 minutes
2	OFF		
3	Workout 2: Total Body	Week 1: 10-12 Week 2: 8-10 Week 3: 6-8	1-2 minutes
4	OFF		
5	Workout 3: Total Body	Week 1: 10-12 Week 2: 8-10 Week 3: 6-8	1-2 minutes
6	OFF		
7	OFF		

***There are no specific rules as to how often you should mix things up, but changing movements every four weeks or so—in this case every training block—is a sound strategy.***

**TABLE 2: SAMPLE ROUTINES FOR BLOCK 1**

### WORKOUT 1

#### Total Body

- Incline barbell press (4 sets)
- Lat pulldown (4 sets)
- Standing overhead barbell press (3 sets)
- Barbell curl (3 sets)
- Cable overhead triceps extension (2 sets)
- Reverse lunge (4 sets)
- Leg curl (3 sets)
- Standing calf raise (3 sets)
- Anti-rotation press (3 sets)

### WORKOUT 2

#### Total Body

- Flat dumbbell press (4 sets)
- One-arm dumbbell row (4 sets)
- Machine lateral raise (3 sets)
- Cable rope hammer curl (2 sets)
- Skull-crusher (3 sets)
- Front squat (4 sets)
- Hip thrust (3 sets)
- Seated calf raise (3 sets)
- Reverse crunch

### WORKOUT 3

#### Total Body

- Hammer chest press (4 sets)
- Wide-grip seated row (4 sets)
- Cross-cable reverse flye (3 sets)
- Concentration curl (2 sets)
- Triceps pressdown (2 sets)
- Deadlift (4 sets)
- Glute/ham raise (3 sets)
- Toe press (3 sets)
- Cable rope crunch (3 sets)



## BLOCK TWO

During Block Two, you'll bump up the frequency so you're now training four days per week. You'll follow a two-on/one-off, two-on/two-off schedule (i.e., Monday, Tuesday, Thursday, Friday) so that each muscle group will be worked twice per week. Training will be carried out using an upper/lower split whereby all the upper body muscles are worked on day one and all the lower body muscles as well as the abdominals are worked on day two. Table Three summarizes the protocol for Block One and Table Four provides a sample routine.

**TABLE 3: PROTOCOL FOR BLOCK 2**

DAY	EXERCISES	REPS	REST INTERVAL
1	Workout 1: Upper Body	Week 1: 10-12 Week 2: 8-10 Week 3: 6-8	1-2 minutes
2	Workout 2: Lower Body Abdominals	Week 1: 10-12 Week 2: 8-10 Week 3: 6-8	1-2 minutes
3	OFF		
4	Workout 1: Upper Body	Week 1: 10-12 Week 2: 8-10 Week 3: 6-8	1-2 minutes
5	Workout 2: Lower Body Abdominals	Week 1: 10-12 Week 2: 8-10 Week 3: 6-8	1-2 minutes
6	OFF		
7	OFF		

**TABLE 4: SAMPLE ROUTINE FOR BLOCK 2**

### Workout 1

#### Upper Body— Chest, Back, Shoulders, Triceps, Biceps

- Machine incline press (4 sets)
- Dumbbell flye (3 sets)
- Assisted/resisted pull-up (4 sets)
- Seated cable row (3 sets)
- Machine shoulder press (3 sets)
- Upright row (3 sets)
- French press (4 sets)
- Incline curl (4 sets)

### Workout 2

#### Lower Body, Abdominals

- Back squat (4 sets)
- Side lunge (4 sets)
- Sissy squat (3 sets)
- Good morning (4 sets)
- Leg curl (4 sets)
- Standing calf raise (4 sets)
- Toe press (4 sets)
- Barbell rollout (4 sets)



## BLOCK THREE

Block Three is designed to promote functional overreaching. Here you'll work out six days per week using a three-on/one-off training schedule. Thus, you'll train Monday, Tuesday and Wednesday, take Thursday off, and then train Friday, Saturday and Sunday, etc.

A three-day split routine will be employed to optimize volume and recuperation. Day one will be chest, back and abs; day two will be lower body, and day three will be shoulders, biceps and triceps. After finishing three weeks of training in this block, the last week should be an active recovery phase where you perform only light aerobic activities. The active recovery period is where you'll ultimately realize maximal muscular gains so it's imperative to allow your body sufficient time off for supercompensation synthesis of muscle proteins. Table Five summarizes the protocol for Block 1 and Table 6 provides a sample routine.

**TABLE 5: PROTOCOL FOR BLOCK 3**

Day	Exercises	Reps	Rest Interval
1	Workout 1:	Week 1: 10-12	1-2 minutes
	Chest	Week 2: 8-10	
	Back	Week 3: 6-8	
	Abdominals		
2	Workout 2:	Week 1: 10-12	1-2 minutes
	Lower Body	Week 2: 8-10	
		Week 3: 6-8	
3	Workout 3: Shoulders	Week 1: 10-12	1-2 minutes
	Biceps	Week 2: 8-10	
	Triceps	Week 3: 6-8	
	OFF		
5	Workout 1:	Week 1: 10-12	1-2 minutes
	Chest	Week 2: 8-10	
	Back	Week 3: 6-8	
	Abdominals		
6	Workout 2:	Week 1: 10-12	1-2 minutes
	Lower Body	Week 2: 8-10	
		Week 3: 6-8	
7	Workout 3: Shoulders	Week 1: 10-12	1-2 minutes
	Biceps	Week 2: 8-10	
	Triceps	Week 3: 6-8	

**TABLE 6: SAMPLE ROUTINE FOR BLOCK 3**



### Workout 2

#### Lower Body

- Bulgarian squat (4 sets)
- Leg press (4 sets)
- Leg extension (3 sets)
- Stiff-leg deadlift (4 sets)
- Lying curl (4 sets)
- Standing calf raise (4 sets)
- Seated calf raise (3 sets)

### Workout 3

#### Shoulders, Biceps, Triceps

- Dumbbell shoulder press (3 sets)
- Cable lateral raise (3 sets)
- Dumbbell bent reverse flye (3 sets)
- Cable curl (3 sets)
- Dumbbell hammer curl (2 sets)
- Preacher curl (2 sets)
- Overhead machine triceps extension (4 sets)
- Cable triceps kickbacks (3 sets)

### Workout 1

#### Chest, Back, Abdominals

- Machine incline press (4 sets)
- Flat barbell press (3 sets)
- Pec deck (3 sets)
- Cross cable pulldown (4 sets)
- Machine row (4 sets)
- Dumbbell pullover (4 sets)
- Hanging knee raise (4 sets)
- Long lever posterior tilt plank (3 sets)

## NUTRITIONAL PLAN

It should come as no surprise that proper nutrition is vital to optimizing body composition. From a weight management standpoint, the most important aspect of any nutritional program is determining total caloric intake. This is consistent with the basic principles of energy balance: if you take in more calories than you expend, you'll gain weight; if you take in fewer calories than you expend, you'll lose weight.<sup>6</sup>

Setting total daily calories is therefore dependent on your goals. For maximizing muscle mass, you'll need to be in a caloric surplus. A good rule of thumb is to multiply your ideal bodyweight (i.e., what you would weigh when you have about 10% body fat) by 20. For example, if your ideal bodyweight is 200 pounds, you'd consume 4,000 calories a day ( $200 \times 20 = 4,000$ ). Alternatively, if your goal is to lose weight, then use a multiplier of 12. Thus, assuming the same goal bodyweight of 200 pounds, you'd consume 2,400 calories a day ( $200 \times 12 = 2,400$ ). Understand that these formulas only provide a rough estimate of calories. You'll need to monitor your progress and then make adjustments as necessary by either increasing or decreasing total calorie consumption.

A limitation of the energy balance equation is that it's not specific to body composition. In other words, it doesn't dictate whether changes are occurring from lean mass or fat mass. This is where obtaining the proper balance of macronutrients becomes essential. Protein consumption is paramount here. The amino acids in protein-rich foods form the building blocks of all proteins in the body, including muscle tissue. While standard protein requirements for the general public are a paltry 0.8 grams/kg of bodyweight, these recommendations do not take into account the demands of intense exercise. Studies show that those involved in heavy resistance training need approximately double the amount of protein as couch potatoes.<sup>7,8</sup> I generally recommend

**Studies show that fat consumption is positively associated with testosterone production; if fat intake is restricted, testosterone levels decline.**







upping this to around 2 grams/kg per day; taking in a little extra protein won't hurt, and it can potentially help to further drive anabolism and/or attenuate catabolic processes.

It's also important to consume sufficient dietary fat. Contrary to what is often professed, low-fat diets are detrimental for building muscle. Studies show that fat consumption is positively associated with testosterone production; if fat intake is restricted, testosterone levels decline.<sup>9</sup> The correlation between testosterone levels and fat intake appears to be especially strong in experienced lifters, potentially increasing needs if you've been training for a while. Research has yet to identify specific requirements as far as the number of grams needed, but a good rule of thumb is to consume between 20-30 percent of calories from dietary fat. More important is to focus on qualitative aspects of the fat sources. Monounsaturated fats (found in olive oil and various nuts) and the long-chain omega-3 polyunsaturated fats derived from fatty fish are particularly beneficial to cellular processes.<sup>10-12</sup> In addition to their role in anabolic function, these fats have been shown to possess a wealth of health-related benefits that span virtually every organ system in your body. As such, they should comprise the majority of your dietary fat intake.

Once you have determined the protein and fat portions of the diet, the balance of calories should necessarily come from carbohydrate sources. Carbs are an important source of energy during intense resistance training. Approximately 80 percent of energy production during bodybuilding-style training is derived from carbohydrate

utilization.<sup>13</sup> As far as losing body fat, there's no reason to be carbophobic; within the context of a well-constructed diet in those who are regular exercisers, the inclusion of carbs will not hinder fat loss. That said, there is substantial variation from person to person as far as insulin sensitivity. Some guys are more insulin sensitive than others, and this can have an effect on your ability to get lean. Thus, you'll need to monitor body fat levels over time and adjust intake accordingly. Focus on non-processed, nutrient-dense carb sources such as fruits, vegetables and whole grains. These foods tend to be more satiating as well as "glycemic-friendly," thereby aiding in weight control.

As far as meal frequency, research suggests that you should eat a minimum of three protein-rich meals a day. The anabolic effects of a meal last approximately four to six hours,<sup>14</sup> so consuming the standard breakfast, lunch and dinner spaced out over the course of a day will ensure that you remain perpetually in anabolism. Contrary to popular belief, however, eating more frequently will not provide any additional benefits as far as "stoking metabolism" and losing body fat provided daily calories are held constant.<sup>15</sup> There is certainly nothing wrong with eating more frequently, but this should be a personal choice rather than one undertaken for body composition purposes. ■

*Brad Schoenfeld, Ph.D., CSCS, FNSCA is widely regarded as one of the leading authorities on training for muscle development and fat loss. He is the author of the best-selling book, The M.A.X. Muscle Plan and runs a popular website and blog at [www.lookinggreatnaked.com](http://www.lookinggreatnaked.com)*

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# SEETHING INTENSITY!

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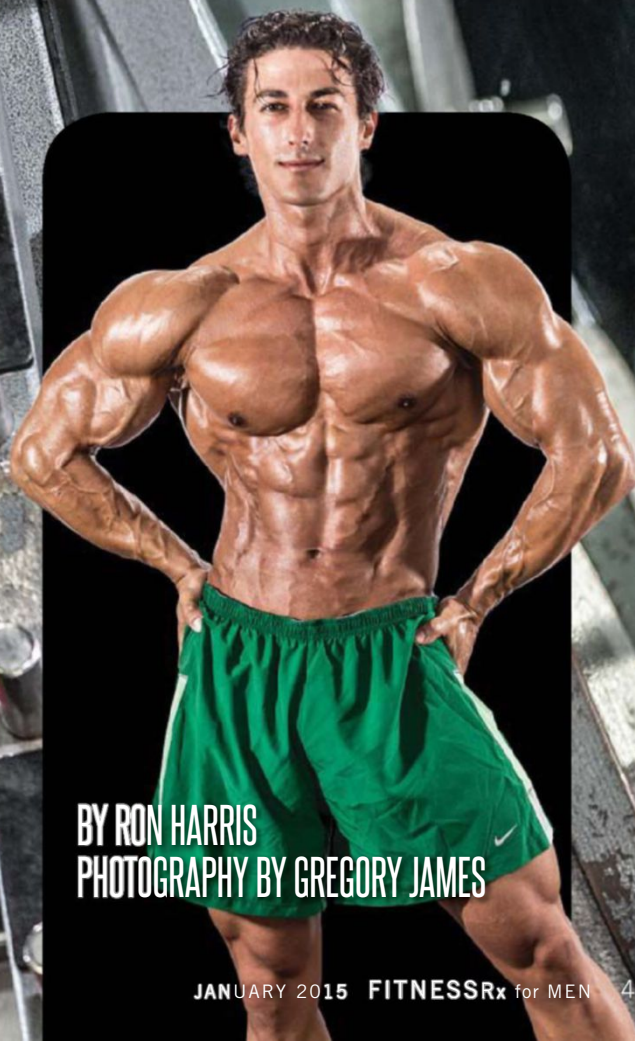




## WITH IFBB MEN'S PHYSIQUE PRO SADIK HADZOVIC

When you think about ways to burn body fat, most of us envision some form of cardiovascular training. Your preferred mode might be running outdoors, or a machine in your gym such as the StepMill or an elliptical trainer. You probably only look at weights as tools to build muscle size and strength, when the fact is, they can be equally effective at ramping up your metabolism and melting away the fat to reveal the sculpted musculature below.

The secret is circuit training. To many of us, that term stirs up images of middle-aged housewives in a zero-intensity workout doing little more than delaying them from their next glass of wine and plate of crackers for a little while. Well get that out of your head. This 500-rep circuit training workout is in a different universe. The man who designed and uses it himself to break up his normal weight training and cardio regimen is top IFBB Men's Physique Pro Sadik Hadzovic, who has the type of physique most men desperately wish they had, and that most women desperately wish to touch!



BY RON HARRIS  
PHOTOGRAPHY BY GREGORY JAMES





**"IF YOU NEGLECT LEG TRAINING REGARDLESS OF YOUR PHYSIQUE GOALS, YOU WILL BE HINDERING YOUR FAT-BURNING EFFORTS."**

## HOW TO PERFORM THE CIRCUIT

Sadik's fat-shredding circuit is comprised of five basic movements, all done for 10 reps with no rest in between: squats, deadlifts, bench presses, pull-ups and standing military presses. That's 50 reps. He does this 10 times in a row with no rest in between circuits for a total of 500 reps. Bear in mind, Sadik is a 27-year-old professional athlete in superb physical condition. If you aren't quite at that level, as most of us aren't, take a bit of time to catch your breath and have a sip of water between circuits. The goal is 10 rounds, but you may need to start off at five and add a round at each successive workout. The weights stay the same, as you won't have any time to increase or decrease the resistance on the bars. More importantly, they should not be too challenging because the purpose here is not to gain muscle mass or power—it's to get you leaner!

At 6 foot and an off-season 220 pounds—cutting down to a chiseled 190 for competitions—Sadik uses "a plate on each side" for everything, which is 135 pounds. That's actually pretty light

for him, though he admits the lactic acid burn during the final couple rounds does make it challenging (and it should also be noted that 135 pounds in a standing barbell press would be quite heavy for most men). So again, adjust for your strength levels.

The first time you try the circuit, 10 or 15 pounds on each side of the bars may be sufficient. The final thing to consider in this or any similar type of workout involving moving from one station to the next is logistics. You'll be taking up a squat rack, a bench press and a chin-up bar for this, and with your fast pace, no one else will be able to "work in" or share that equipment until you're done with it. So, performing the 500-rep workout at a crowded gym with limited equipment is probably not practical. If you can, do it at off-peak hours or at least do your best to avoid obstructing others' workouts. Unless the gym is completely empty, it's wise to "mark your territory" or else other gym members might assume the bench or squat rack is free, and someone merely left their weights out of poor gym courtesy.

"What I do is leave a T-shirt at

## SQUATS

This is the classic king of all lower body movements, and one that happens to be the most demanding both on your legs and your lungs. Sadik includes intense weight training for his legs year-round in his training, which strikes some as ironic, since Men's Physique athletes compete wearing board shorts that cover up their thighs.

"What most people don't understand is just how powerfully leg training stimulates your metabolism and burns fat," he tells us. "If you neglect leg training, regardless of your physique goals, you will be hindering your fat-burning efforts." Hadzovic takes a shoulder-width stance with the bar high on his back, picks a spot up diagonally on the wall or mirror in front of him, and sinks down to parallel before driving back up.



one station, my gym bag at another, and a water bottle at another one," Sadik laughs. "I have to be that guy or else someone will start using it if I'm not there at that very second."

Now that you're ready, let's run down the five movements you will be performing.





## DEADLIFTS

Next up is the deadlift, which is the closest thing to a full-body exercise there is, involving not only the entire lower body in the initial half of the movement, but also the entire back from traps to spinal erectors, the rear delts and the biceps as you pull to the top position.

Sadik uses an overhand grip with his legs a bit closer together than shoulder width. "That's where it feels right for my particular structure; everyone should experiment to find what's best for them," he notes. He keeps in constant motion, never allowing the bar to touch the floor between reps and never locking out. Deadlifts are neck and neck with squats in terms of demands placed on the cardiovascular system, so by now his breathing and heart rate are definitely increasing.



## BENCH PRESS

That's the perfect time to lie down for a minute and give the lower body a brief respite while you call your chest, front delts and triceps into play on the classic barbell bench press. Sadik takes a shoulder-width grip on the bar, heels planted firmly on the floor, and smoothly presses out 10 reps. As with the deadlift, he avoids locking the bar out at the top of each rep and instead maintains continuous tension and movement.







## PULL-UPS

Deadlifts work the back by pulling a weight from the floor, and chin-ups force the lats to work by pulling your bodyweight up toward a bar. Sadik takes an overhand grip just outside of shoulder width, and pulls for 10 clean reps. He keeps his form strict, never allowing his body to swing back and forth. "I never want momentum to do the work for me, only the muscles," he clarifies.



## STANDING MILITARY PRESS

The final movement is not one most of you are accustomed to. No doubt you do overhead presses for shoulders, but the most common methods are to perform them seated with either a barbell, dumbbells or using a machine.

"I do them standing to activate the core more, and also because this is simply the hardest way to do the exercise," Hadzovic observes.

Making exercises tougher, rather than easier, is almost always the most effective way to see results from your gym time. Another advantage of doing them this way is that you aren't taking up another piece of equipment such as a seated bench. Sadik has one foot forward and one back to give himself greater stability as he presses. As he thrusts the barbell up, he ducks his head forward so that the bar is directly in line over his shoulder girdle.





## SADIK HADZOVIC CONTEST HISTORY

2014 Olympia – 2<sup>nd</sup>  
2014 Tampa Pro – 1<sup>st</sup>  
2014 New York Pro – 2<sup>nd</sup>  
2013 Olympia – 4<sup>th</sup>  
2013 New York Pro – 1<sup>st</sup>  
2013 Pittsburgh Pro – 4<sup>th</sup>  
2013 Europa Show of Champions – 2<sup>nd</sup>  
2012 Houston Pro – 4<sup>th</sup>  
2012 Valenti Gold Cup – 1<sup>st</sup>  
2012 Orange County Muscle Classic – 2<sup>nd</sup>  
2012 Greater Gulf States Pro – 2<sup>nd</sup>  
2012 Junior Nationals – Overall Champion

## DAILY DIET AND SUPPLEMENTS

Meal 1: Half a pound of lean protein chicken or turkey or 8-10 egg whites, half a cup of oats  
Meal 2: Half a pound of red meat, 1 cup white rice  
Meal 3: Half a pound of fish, one large potato  
Meal 4: Supertein protein shake by GAT  
Meal 5: Half a pound of fish, with asparagus or broccoli  
Pre-workout: 1 scoop Nitraflex by GAT  
Intra-workout: 2 scoops JetMass by GAT  
Post-workout: Supertein protein shake by GAT  
Meal 6: Half a pound of lean protein chicken or turkey or 8-10 egg whites, with some fats, either egg yolk or almonds.

*Sadik Hadzovic is a Team GAT Athlete. For more information on GAT supplements, please visit TeamGAT.com*



## HIIT SPRINTS

That circuit is devilishly effective at forcing your body to give up its fat stores, but when used in conjunction with the proper form of cardio, your results will be that much more satisfying. High-intensity interval training has been shown not only to burn more fat in less time, but to keep your metabolism elevated longer so that your keep on burning fat for many more hours thanks to a phenomenon called EPOC, which stands for excess post-exercise oxygen consumption. It's Sadik's preferred way to perform cardio, and he does it first thing in the morning on an empty stomach.

"In the absence of glycogen, which is how the body stores carbohydrates, it turns to body fat to burn as a fuel source instead," he explains. Living in Long Island, New York, Sadik likes to do his HIIT cardio outdoors any time weather permits. "Outdoor running activates the core better, so I feel it is more effective," he notes.

But when snow or rain makes that impractical, Hadzovic will head

indoors to Bev and Steve's Powerhouse Gym in Syosset to run on a treadmill instead. After warming up with a couple minutes of fast walking, Sadik alternates 60 seconds of running with 60 seconds of fast walking over and over again for 45 minutes. That

**"I NEVER WANT  
MOMENTUM TO  
DO THE WORK  
FOR ME, ONLY THE  
MUSCLES."**

expends the same amount of calories as it would take 90 minutes or more to do at a steady pace of fast walking. He will do this six mornings a week.

Once again, it needs to be said that Sadik is in tremendous condition. Twenty minutes of HIIT cardio, three to four times a week, is a good place for most of us to begin at and build on.

## A QUICK NOTE ON DIET

It always needs to be said that any type of training, whether you're attempting to build muscle or lose body fat, is only going to be truly effective with the right nutritional support. You can do tough workouts like this one diligently, but if you insist on eating things like pizza, burgers and fries, cookies and go out drinking a few nights a week, you will effectively negate all your results. Take a look at Sadik's daily diet (see sidebar) to get an idea of how clean you should be eating to make your workouts translate into the improvements you want to see when you look in the mirror.

Are you ready to see your body fat go up in flames so your can show off a clear six-pack and granite-hard muscle definition in your back, chest, shoulders and arms? Take Sadik's 500-rep workout, add in some HIIT cardio, and watch the fat melt right off your body!

Website: [www.sadikhadzovic.com](http://www.sadikhadzovic.com)  
Instagram and Twitter: @SadikHadzovic



# THE BETTER SEX WORKOUT AND DIET

## A SCIENTIFIC APPROACH

Sexual problems in men are more common than one may think (there is a reason why sex-boosting drugs like Viagra sell like crazy). But the truth is, bad sex is *not* inevitable as you age, and improving your health helps improve your sexual performance.

Poor health habits, such as inactivity, smoking and diet, contribute to degenerative diseases as well as poor sexual performance. In fact, research has found that sexual disorders are often symptoms of serious health problems. Erectile dysfunction may be an early symptom of serious disease, as men who have coronary artery disease (hardening of the arteries) or diabetes often have erectile dysfunction.

The research supports the idea that good health and good sex go hand in hand. A study from the Mayo Clinic in Rochester, Minnesota found that erectile capacity improved following lifestyle changes like diet and exercise. Other research has found that physical activity prevents erectile dysfunction, which has been linked to poor metabolic health. Regular exercise also stimulates nitric oxide release and promotes the health and function of the endothelial cells—the cells lining the blood vessels (drugs like Viagra also stimulate the release of nitric oxide by the endothelial cells, which makes it easier to get an erection). In fact, a Finnish study found that people

with the metabolic syndrome (a group of risk factors linked to heart disease) were *more than 100 percent* more likely to have erection problems than people who exercise regularly. And women are affected as well. An interesting study involving Portuguese women of reproductive age found that abdominal fat mass is associated with a lesser capacity for vaginal orgasm.

The good news is that the right diet and exercise program can have a positive impact on your sex life. Using all the latest research, the team here at FitnessRx has put together an essential guide to staying healthy while improving your sex life.

### WHAT IT TAKES

There are a few key factors necessary when it comes to better sex, and each factor is related to the other:

**Improved metabolic health.** Sexual function reflects your metabolic and emotional health, and the research shows that you can boost sexual performance and prevent degenerative diseases with regular physical activity, a healthy diet, abstaining from smoking and reducing stress.

Symptoms of the metabolic syndrome include hypertension (high blood pressure), insulin resistance, abnormal blood fats, abdominal obesity, inflammation and type 2 diabetes,

and it has also been linked to erectile dysfunction, premature death, heart attack and stroke, and psychological depression. So that means that problems with sex drive, erections and ejaculation could be signs of a sluggish metabolism or serious disease, and that's why it's important to share your sexual problems with your physician.

More specifically, ED or low sex drive may signal blood vessel disease, insulin resistance or deep-seated emotional problems that require professional help.

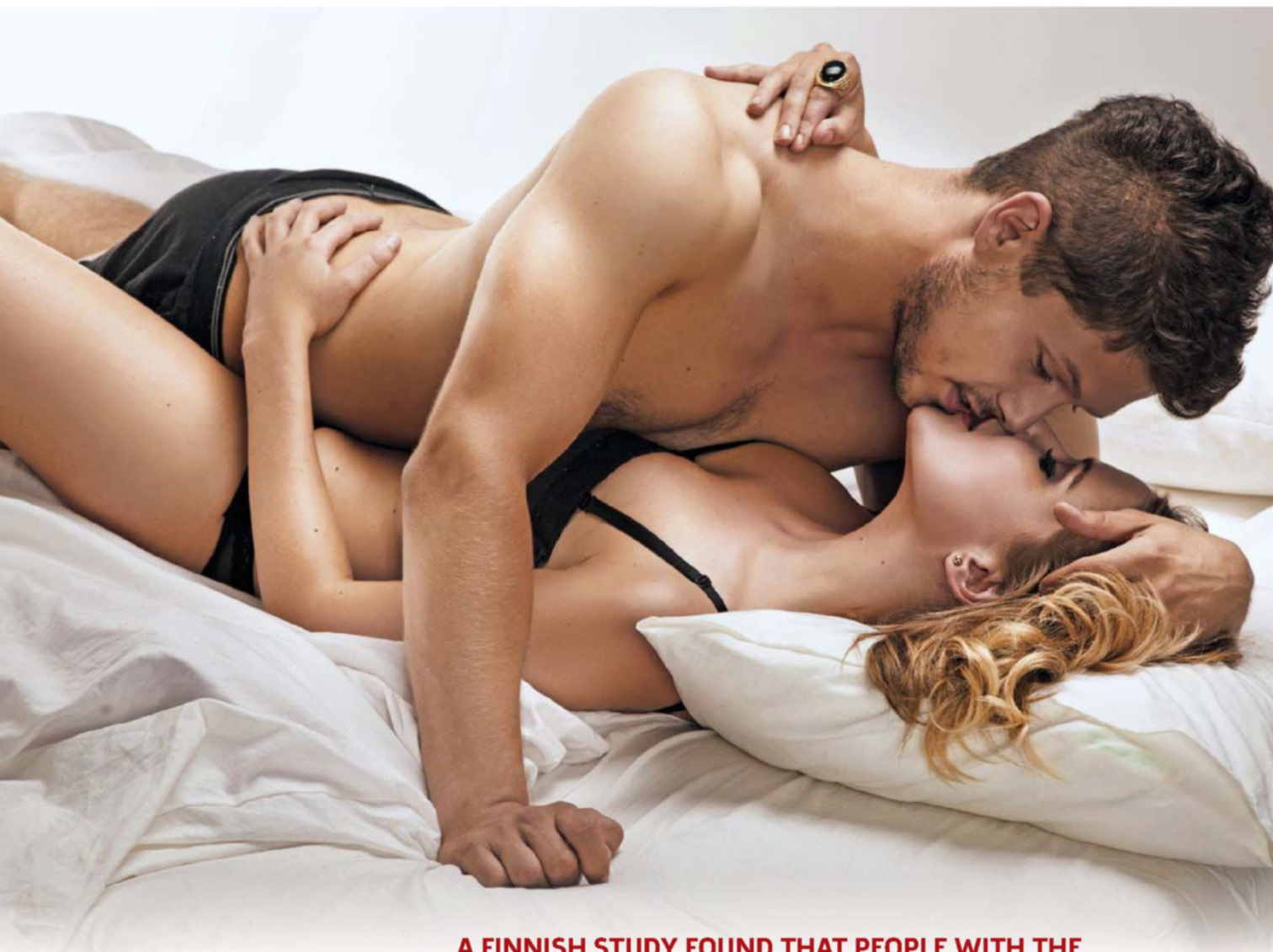
### Increasing testosterone levels.

After about age 35, testosterone levels in men begin to decline, which can result in muscle atrophy, psychological depression, and declined sexual performance. So obviously, it is important to keep those testosterone levels up not only to ensure sex drive, but also for sperm cell production, capacity for erections, sex drive and muscle mass.

In fact, more and more research is revealing that adequate levels of testosterone, particularly the biologically available free testosterone, are essential for normal sexual function. A review of literature by scientists from Cooper University Hospital in Camden, New Jersey found that testosterone was critical for controlling the contractile tissues in the penis, which are essential for producing normal erections.

### Promoting blood flow control.





**A FINNISH STUDY FOUND THAT PEOPLE WITH THE METABOLIC SYNDROME (A GROUP OF RISK FACTORS LINKED TO HEART DISEASE) WERE MORE THAN 100 PERCENT MORE LIKELY TO HAVE ERECTION PROBLEMS THAN PEOPLE WHO EXERCISE REGULARLY.**

Lack of exercise and an unhealthy diet impacts the ability of insulin receptors to regulate carbohydrates, amino acids and fats. Insulin sensitivity negatively affects the health of the cells that line the blood vessels called the endothelium. These cells release nitric oxide that opens blood vessels in the penis, and poor blood flow control makes it extremely difficult to achieve erections.

According to several studies conducted in Europe, exercise is as effective as Viagra for improving erection capacity in aging men, and Turkish scientists found that a cardio program improved nitric oxide secretion in the penis and increased testosterone levels.

**Cutting body fat.** Increased body fat, particularly stomach fat, has been linked to erectile dysfunction, decreased sex drive, lower testosterone and reduced energy levels. In addition, testosterone

increases nervous receptors and enzymes (such as hormone-sensitive lipase) that speed fat breakdown.

#### **DIET ESSENTIALS**

The Mediterranean diet is a good choice for many reasons, and the research shows it's one of the healthiest diets. This type of diet has been shown to promote metabolic health, prevent free radical damage that impairs sexual function and increase energy. It's pretty simple—eat a variety of fruits, vegetables and whole grains every day. Take in enough calories and protein (1 to 1.5 grams of protein per kilogram bodyweight) to maintain testosterone levels and support a healthy, vigorous

lifestyle. The Mediterranean diet also includes olive oil, nuts, lean meats, fish, poultry and moderate amounts of red wine.

Here are some more diet guidelines:

**Supplements.** Some research suggests that beetroot juice, omega-3 fatty acids (from supplements or fish) and the amino acids arginine and citrulline improve sexual health. In addition, it's been found that antioxidant vitamins E, C and selenium and n-acetylcysteine (NAC) may help maintain testosterone levels by preventing free radical damage to the hormone (free radicals promote aging and depress the immune system). Also, folic acid (folate) deficiency is linked to





## CYCLING AND SEX HEALTH

Multiple studies have shown a link between bicycling and sexual dysfunction. For men, the most common symptoms described are perineal numbness and erectile dysfunction—occurring in up to 24 percent and 61 percent, respectively, in select groups of riders. In an analysis involving 160 men who responded to a survey conducted after a 540-km bicycle race held in Norway, 22 percent revealed penile numbness and 13 percent reported erectile dysfunction. In another study, there was a reported 61 percent rate of perineal numbness and a 19 percent rate of erectile dysfunction in cyclists who ride more than 400 kilometers in a week. Vascular and nerve injuries may be the causes of erectile dysfunction in cyclists. Other urological conditions that have been reported in cyclists include penile thrombosis, infertility, hematuria, perineal nodular induration and more.

Studies show that the position on the bicycle, as well as different types of bicycle seats can make a difference. One study found that a narrow saddle, as opposed to a wide saddle, had a negative effect on penile blood flow, which could result in erectile dysfunction. In an Internet-based survey evaluating different bicycle characteristics and erectile dysfunction, it was found that riding a mountain bike, using a saddle with a central cutout and keeping the handlebar height higher than the saddle increased the risk of perineal numbness and erectile dysfunction.

The research on women is limited, but there are some studies that also show a link between cycling and sexual dysfunction in women. One study involved 13 women with sexual dysfunction and previous blunt perineal trauma. In about 77 percent of these patients, the cause of the trauma was a bicycle crowbar accident that resulted in perineal numbness, bruising and genital bleeding. Another study compared the genital sensation and sexual function in 48 female cyclists and 22 female runners. It was found that in the cycling group, 62 percent of the participants had genital pain, numbness and tingling.

In women, the research showed that both narrow saddles and saddles with central cutouts increased pressure in cyclists, but the effects of these saddles on pudendal nerve function could not be determined.

## ERECTILE DYSFUNCTION MAY BE AN EARLY SYMPTOM OF SERIOUS DISEASE, AS MEN WHO HAVE CORONARY ARTERY DISEASE (HARDENING OF THE ARTERIES) OR DIABETES OFTEN HAVE ERECTILE DYSFUNCTION.

erectile dysfunction, according to a study from the Reproductive Medical Center at Renmin Hospital of Wuhan University in Wuhan, China. Folate is a B vitamin that is critical for cell growth, cell repair and red blood cell metabolism.

Recently, the B vitamin niacin has been shown to increase erectile function. Niacin is a vasodilator and increases blood flow to the penis. It also lowers LDL (bad cholesterol) and increases HDL (good cholesterol) for improved sexual function.

Vitamin D is another important nutrient for healthy sexual function. Low levels of vitamin D have been linked to low testosterone. An Austrian study showed that supplementing vitamin D (3,000 IU per day) for one year increased testosterone by 20 percent and the biologically active free testosterone by 17 percent.

Also, while protein supplements may help you control bodyweight and increase muscle mass, it's been found that soy protein contains chemicals called phytoestrogens that bind with estrogen receptors and may decrease sexual performance in men.

**Count Calories.** Consuming more calories than you burn leads to weight gain. To get a general estimate of the calories you need every day, you can use the following simple equation. Multiply your weight by 10 and then add your weight multiplied by 3, 5, or 10, depending on your activity level. Caloric intake for weight maintenance = [weight (lb) x 10] + [weight (lb) x 3 (if inactive), x 5 (if moderately active), or x 10 (if extremely active)]

**Grains.** Emphasize whole grain foods, such as whole grain cereals, breads, crackers, rice and pasta.

**Vegetables.** Eat a variety of vegetables, emphasizing dark green vegetables like broccoli, spinach and kale. Other important vegetables include carrots, sweet potatoes, beans, peas, and beans such as pinto beans, kidney beans and lentils.

**Onions.** You might want to have a mint after consuming anything with onions, but a study on rats from the University of Science and Technology in Jordan found that supplementing onion juice increased the frequency of sex and the recovery between bouts of sex. Onion juice also increased testosterone levels.

**Fruits.** Eat a variety of fruits that may include products that are fresh, frozen, canned or dried. Focus on fresh fruit rather than store-bought fruit juices.

**Dairy products.** Aim for low-fat or fat-free dairy products, such as milk, yogurt and cheese.

**Meats.** Low-fat or lean meats, poultry and fish are important for maintaining normal testosterone levels. Bake, broil, or grill meats and avoid frying. Vary the protein sources in your diet, and try to bake, broil or grill meats rather than frying.

**Fats.** Get your healthy fats from fish, nuts and vegetable oils (particularly olive oil), and limit your intake of butter, stick margarine, lard and saturated and trans fats.

**Carbohydrates.** Emphasize complex carbohydrates.

**Limit sugar intake.** High-sugar foods are rich in calories but provide few nutrients.

**Limit alcohol consumption.** The occasional glass of red wine has been shown to have positive health benefits. But Turkish researchers, in a study on rabbits, found that chronically high alcohol consumption impaired the secretion of nitric oxide, which promotes erection problems.





## THE BETTER SEX WORKOUT PLAN

Here's what every exercise plan should include for better sex, followed by a sample weekly routine.

**Cardio.** Try to do *at least* 30 minutes of moderate intensity exercise three to six days per week. As we've discovered, a regular exercise plan will contribute to metabolic health and optimize blood flow, increase testosterone and give you the energy and libido for good sex.

**Interval training.** Try high-intensity interval training about two times per week. This type of short-duration, intense muscular exercise has been found to turn on cell biochemical pathways in muscle that stimulate growth and promote the release of anabolic hormones.

In fact, Canadian scientists found that HIIT caused rapid cellular and cardiovascular changes that resemble traditional endurance training. HIIT did not, however, turn off signaling pathways that stimulate muscle protein synthesis and growth. So HIIT is good all-around—for promoting good sex, increasing testosterone and muscle mass, cutting fat and promoting metabolic health.

Here are two interval training programs you can try:

- Six to 10 sets of 30-second sprints at 100 percent effort on an elliptical trainer or stationary bicycle, with three to four minutes of rest between each sprint.
- On a 400-meter school track, sprint the straightaways and walk the turns for one to two miles. Increase the distance

### Monday, Wednesday, Friday:

**Cardio:** 30 to 90 minutes

Sample weight training workout:

**Squats** (with or without weights)

1-3 sets x 10 reps

**Lunges** (with or without weight) 1-3 x 10

**Curl-ups** 1-3 x 15

**Side bridges** 1-3 x 10 seconds, left and right sides

**Isometric spine extension** (bird dog)

1-3 x 10 seconds left, and right sides

**Bicycle exercise** 1-3 x 10

**Bench press** (can substitute push-ups) 1-3 x 10

**Lat pulls** (can substitute pull-ups) 1-3 x 10

**Dumbbell rows** 1-3 x 10 each arm

**Tuesday, Thursday:** Interval training

**Saturday, Sunday:** Rest days

as you improve your endurance.

**Lift weights.** If you're reading FitnessRx for Men, obviously you already lift weights. But it's important to understand *why* lifting weights is essential for better sex—weight training boosts testosterone and makes it work better and helps control abdominal fat (and increases muscle mass, of course).

## LIFESTYLE TIPS

Workouts and nutrition are essential of course, but here are some general lifestyle tips for promoting better health and sex.

- **Get enough sleep:** Lack of sleep can depress testosterone levels, increase cortisol and lower sex drive.
- **Don't stress:** Excessive stress can also lower testosterone, and also impair the immune system. Chinese researchers, in a study on rats, found that five weeks of chronic stress exposure impaired the health of the Leydig cells, which secrete testosterone. Examination of the tissues with an electron microscope showed abnormalities in the cell membranes and evidence of cell death. Look for things that help you personally de-stress after a long day, whether it be taking a walk or relaxing in front of the TV.

• **Think positive:** Believe it or not, but your mental state can actually affect your testosterone levels and sexual performance. For example, it's been shown that testosterone levels go up after winning an athletic contest but go down after a loss. In addition, assertive behavior followed by a rise in status may lead to an increase in testosterone levels.

• **Stay sexually active:** The best advice for maintaining sexual health is to practice, practice, practice! This will increase testosterone and improves metabolic health, which is important for good sex.

• **If you're having sexual problems,** make a doctor appointment: Medical problems, such as diabetes and neurological disorders, can impair sexual performance. Even if you follow all this training and diet advice for good sex, it may not be enough if there are underlying health issues. ■

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## SEX AND LOW BACK PAIN

A study published in the journal *Spine* researched how different sexual positions affected the back and spine. Ten heterosexual couples participated in the study, which involved five different sexual positions and eight infrared motion capture cameras to monitor movements on different areas of the participants' bodies. The researchers concluded that spooning increased lower back pain in men, and that a variant of the missionary position in which the man supports himself on his elbows is also not a good idea (a better option for the spine was for the man to hold himself up with his arms extended). However, the opposite was true for men who have back problems that are made worse by extending back and up.



# DON'T RISK MUSCLE TO GET RIPPED

*Jeff Seid*  
**Jeff Seid**  
IFBB Physique Pro

## POST-WORKOUT reDEFINED

One of the biggest risks every athlete on a low carb, low calorie or pre-contest diet faces is the loss of muscle mass. While low carb and low calorie diets are effective for facilitating fat loss, they also leave your body vulnerable to falling into a catabolic state. DARK MATTER ZERO CARB CONCENTRATE is the result of the latest research surrounding how to elicit maximum post-workout protein synthesis, ATP replenishment and insulin spiking without using loads of carbs or sugar. Taking DARK MATTER ZERO CARB CONCENTRATE immediately after your workout will help create a favorable muscle building environment so you can get the most out of your workouts and be your absolute best, even when you are dieting!

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# MIRACLE POWERS OF CAPSAICINOIDS



## *for Fat Loss, Performance and Health*

Capsaicinoids are a class of compounds naturally found in chili peppers that contribute to the hot and spicy flavor of the chili pepper. Capsaicinoids also function in humans, where their consumption has been shown to thermogenically increase energy expenditure, producing clinically significant levels of weight loss.<sup>1</sup>

Furthermore, the regular consumption of capsaicinoids has also been shown to significantly reduce appetite and food intake,<sup>1</sup> which importantly supports long-term weight loss. Although the mechanism of action for fat loss is not completely understood, some of the details include capsaicinoid activation of the TRPV1 receptor, which triggers the release of noradrenaline. The release of noradrenaline increases energy expenditure and fatty acid oxidation within brown adipose tissue (BAT) by stimulating thermogenesis. In addition, the release of noradrenaline from capsaicinoid intake also reduces hunger by activating noradrenaline receptors in the brain that produce feelings of satiety.<sup>2</sup>

Capsaicinoids also trigger release

of the neurotransmitter dopamine within the brain, increasing motivation and arousal within the central nervous system.<sup>3</sup> The ability of capsaicinoids to bolster motivation supports a more energized workout for a superior training effect. Additional research has also demonstrated that capsaicinoids can

***“Their consumption has been shown to thermogenically increase energy expenditure, producing clinically significant levels of weight loss.”***

have a positive impact on your health by decreasing cholesterol levels for improved cardiovascular performance.<sup>4</sup>

### **THERMOGENICALLY MELT BODY FAT**

Several studies have shown that the TRPV1 receptor is activated by various food-related compounds that

bind to TRPV1 within the oral cavity or gastrointestinal tract, activating the sympathetic nervous system and BAT-activated thermogenesis. Among the TRPV1 activators investigated so far, the most extensively studied has been capsaicinoids.<sup>5,1</sup>

Capsaicinoid-induced release of noradrenaline promotes fat loss by increasing a process known as thermogenesis in BAT. This occurs when noradrenaline binds the beta-adrenergic receptor embedded within the cellular membrane of BAT, which turns up fatty acid oxidation. BAT is composed of a unique type of fat cell that generates a considerable amount of heat instead of cellular energy (ATP) when oxidizing fat. As a result, instead of the energy from fatty acid oxidation synthesizing ATP, it is instead thermogenically converted into heat, which boosts fat burning as well as energy expenditure.

In several studies, capsaicinoids were shown to increase BAT-driven thermogenesis in humans through the activation of TRPV1 found in the oral cavity and gastrointestinal tract. Activation of TRPV1 stimulated



noradrenaline release, driving BAT-induced thermogenesis and fat loss.<sup>8-8</sup> In addition, other studies showed that longer term ingestion of capsaicinoids for approximately six weeks increased the amount of BAT tissue for even greater levels of thermogenesis and reduced body fat.<sup>9,5</sup>

### KEEP FAT OFF BY REDUCING HUNGER

Attempts to advance weight loss and weight maintenance have rapidly embraced the use of several naturally occurring compounds that burn fat while also decreasing appetite. One of the more effective examples being capsaicinoids, which have been shown to reduce food intake<sup>1,10,11</sup> while also significantly reducing the desire to eat more food.<sup>10</sup>

Although an influence on appetite has been observed in several trials, it is not completely understood how capsaicinoids reduce appetite. However, some of the details have been uncovered. It appears that the release of noradrenaline triggered by the capsaicinoid, by way of the TRPV1-related mechanism, minimizes appetite as the stimulation of the noradrenaline receptors in the brain has been shown to produce feelings of satiety.<sup>12</sup> In addition, the consumption of capsaicinoids has been shown to cause an increase in the gut-derived hormone GLP-1, which regulates regions of the brain that control food intake, resulting in reduced hunger and food consumption.<sup>2</sup>

Altogether, capsaicinoids potentially stimulate and preserve fat loss, as the preponderance of recent evidence clearly shows their comprehensive ability to increase energy expenditure and fat oxidation while simultaneously reducing appetite.

### INCREASE MOTIVATION AND AROUSAL FOR MORE INTENSE TRAINING

A decrease in the neurotransmitter dopamine within the central nervous system (CNS) is associated with feelings of tiredness and lack of motivation, especially during prolonged exercise.<sup>13</sup> On the contrary, greater dopamine levels favor improved performance through the maintenance of motivation and arousal. The decrease in dopamine during exercise is due to the degradation of dopamine that comes from increased neuronal activity within the CNS during exercise.<sup>14</sup> Therefore, increasing dopamine levels by reducing its exercise-induced degradation will improve CNS function, elevating exercise performance.

## THE FINAL WORD? Low-Carb vs. Low-Fat

By Daniel Gwartney, M.D.

Again with the diets. Will it ever end? Is there a “best” diet? Well, there is new study that claims to have proven so, and a meta-analysis review stating there is no single best diet. And they wonder why people just want to take a pill?

Robert Atkins, M.D. was a cardiologist who championed a low-carbohydrate diet, but never received the professional respect he deserved. Through research and personal weight-loss efforts, he discovered the efficacy and potential health benefits of following a low-carbohydrate diet. Of course, this flew in the face of prominent cardiologists and dietitians who were touting a low-fat approach to weight management and cardiovascular health. The issue became ugly from a professional perspective. Certainly, the public was not well served, as obesity rates tripled during this time dominated by the low-fat advocates.

Isolating the argument solely to weight loss, several comparative trials have been published. As reported in a recent review, when collective results from numerous trials (48 trials involving more than 7,000 subjects) were analyzed, a diet is a diet when it comes to weight loss.<sup>1</sup> Again, they found that low-carbohydrate diets produced a slightly greater weight loss during the first six months. By 12 months, there was essentially no difference in weight loss between those assigned to low-carbohydrate or low-fat diets. This should come as no surprise, as it agrees with several previously published trials and reviews.<sup>2,3</sup> Sadly, this has inspired some to re-state the simple equation that weight loss simply follows fewer calories consumed than expended.<sup>4</sup> In fairness, the author of that editorial does note that successful weight loss for the individual is entirely dependent upon adherence, and total calories consumed plays a major role, as well as the nutritional quality of the diet.

**Certainly, the public was not well served, as obesity rates tripled during this time dominated by the low-fat advocates.**

Compare that track record—no difference between low-carbohydrate and low-fat diets in regard to weight loss, to the conclusion of a recent 12-month clinical trial, “The low-carbohydrate diet was more effective for weight loss and cardiovascular risk factor reduction than the low-fat diet.”<sup>5</sup> Well, who’s right? Certainly, the low-carbohydrate group in the latest study lost more weight than the low-fat group. The difference at the end of the 12-month trial was 3.5 kilograms (about eight pounds). However, that degree of difference was achieved in the first three months, and no further benefit was noted throughout the remainder of the trial. Interestingly, by 12 months, both groups had reduced their waistline nearly the same amount.

Nonetheless, there was greater weight loss and the difference was maintained throughout the year. Is that the final answer? Well, the study did have some issues that make it difficult to apply to a general comment. Looking at the subjects—they were obese, mostly women, and the intervention involved dietary recommendations, a single daily meal replacement product, and periodic counseling. The “low-carbohydrate” diet certainly was designed to be fairly restrictive, allowing for only 40 grams of carbohydrates (excluding fiber); the “low-fat” diet recommended 55 percent of calories coming from carbohydrates, and less than 30 percent from fat. Yet, the recommendations were violated, resulting in the low-carbohydrate group consuming between 93 and 127 grams of carbohydrate daily (average with a wide variance), and the low-fat group only needed to decrease their fat intake by 5 percent of their calories to meet the goal. The “real life” experience really did not match the study design. Other issues are present, but space does not allow for a full discussion.

So, what is the final word in diet? Seriously, what works for you is what works for you. There are metabolic advantages and benefits to low-carbohydrate diets, and the restriction may not need to be as severe as suggested from the study results. If low-carbohydrate diets had the “favored” status that low-fat diets have held, the research would be challenging low-fat diets as having no weight loss benefit and lacking certain metabolic and cardiovascular benefits.

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# BURN FAT WHILE YOU SLEEP\*



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Capsaicin, the main capsaicinoid found in chili peppers, has recently been shown to boost dopamine levels in rats.<sup>9</sup> In a study by Marinelli et al., the researchers showed that the injection of capsaicin into mice enhanced dopamine production and release. Moreover, this effect was shown to be mediated through TRPV1 activation, as chemical inhibition of TRPV1 in this study also inhibited the release of dopamine. These results suggest that capsaicinoid activation of TRPV1 has multiple effects within the body, where one of them is a positive influence on dopamine release in the brain.

### LOWER CHOLESTEROL

In addition to the previously mentioned benefits, research has also demonstrated that capsaicinoids have a beneficial influence on the cardiovascular system. In one study by Huang et al.<sup>15</sup>, they showed that capsaicinoids, but not the chemically related capsinoids, appreciably increased the production of bile acids. The authors of this study suggest that the increased bile acid levels from capsaicinoid ingestion contribute significantly to the hypocholesterolemic effect of capsaicinoids, as cholesterol is removed from the body by way of bile acids. In addition, the authors also proposed that the increased conversion of cholesterol into bile acids in response to capsaicinoid ingestion also contributes to the cholesterol-lowering effect of capsaicinoids.

Interestingly, additional studies have shown that bile acids also reduce body fat by upregulation of thyroid hormone signaling and thermogenesis in BAT<sup>16</sup>, indicating yet one more fat-burning mechanism caused by capsaicinoids.

In closing, because of the exceptional influence that capsaicinoids have on fat loss, exercise performance and overall health, Advanced Molecular Labs and its CEO Steve Blechman have added a unique blend of capsaicinoids to its revolutionary products Thermo Heat and Thermo Heat Nighttime, making both of these products cutting-edge fat burners that bolster performance in the gym while concurrently supporting a healthier lifestyle.

*For most of Michael Rudolph's career he has been engrossed in the exercise world as either an athlete (he played college football at Hofstra University), personal trainer or as a research scientist (he earned a B.Sc. in Exercise Science at Hofstra University and a Ph.D. in Biochemistry and Molecular Biology from Stony Brook University). After earning his Ph.D., Michael investigated the molecular biology of exercise as a fellow at Harvard Medical School and Columbia University for over eight years. That research contributed seminally to understanding the function of the incredibly important cellular energy sensor AMPK—leading to numerous publications in peer-reviewed journals including the journal Nature. Michael is currently a scientist working at the New York Structural Biology Center doing contract work for the Department of Defense on a project involving national security.*

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# SPARTAN UP!

## DO YOU THINK IT'S SAFE TO STRETCH BEFORE A RACE? IF NOT, WHAT'S A GOOD WARM-UP TO DO BEFORE SPARTAN?

**Pre-race stretching** is important, however the type of stretching you may initially think of, and **what we** are actually referring to, may be different. Static stretching, which most people perform **when they think of stretching**, is stationary stretching where each position is held for an extended **period of time**. Unfortunately most people don't even do this right. Most people do the obligatory **arm pull across the body**, half-hearted toe touch, and leg pull behind the back (each usually being held for a **total of about five seconds**). Sure it's better than nothing, but it's really not going to do you a **lot of good on the course**.

**Dynamic stretching**—stretching performed while moving—helps to increase your heart rate, **opens up your joints**, and helps to reinforce good posture. At each race we have an SGX coach that **leads racers in a series of dynamic movements** designed to warm the body up, get your blood **flowing**, and **increase performance** while reducing the chance of injury right out of the gate. Make sure **you get to the start line 15 minutes early** in order to take part in the SGX coach-led dynamic warm-up—**your body will be glad you did**.

## I WORK OUT AS OFTEN AS I CAN, BUT I'M REALLY BUSY DURING THE WEEK. I'D LIKE TO TRY TO PREPARE FOR A SPARTAN RACE BUT MY TIME IS LIMITED. ANY ADVICE ON FITTING TRAINING INTO A BUSY SCHEDULE?

Turn off the TV. Get up an hour earlier. Stop making excuses. That is a good place to start. Other recommendations are to just get outside and start running. Ten minutes here, 15 minutes there. When you get home from your run, do 30 burpees, 30 air squats and 30 push-ups. Buy a pull-up bar you can put in a high traffic doorway in your home and every time you cross that threshold, do 10 dead hang pull-ups. There are a

number of seven-minute, 10-minute and 15-minute workouts that you can find online (including the Spartan Race WOD) to help you get ready.

The biggest thing to look at, though, is your lifestyle. If you don't have time because you are spending an hour watching a TV every day, use that hour to get up and go exercise. Also take a look at your eating habits, because most likely if you are sitting around watching TV, or "too busy" in your day to exercise, you are most likely sacrificing proper nutrition in favor of quick grabs at a drive-thru. Don't do it. Simple changes to your daily habits will not only help you prepare for the race, they will help you feel better in general. You will thank us later.

## WHAT CAN I DO TO RELIEVE SORENESS AFTER A TOUGH WORKOUT OR COMPLETING A RACE?

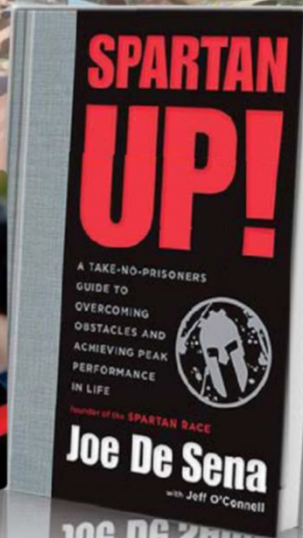
Drink lots of water and eat. All too often after the race is done, we see people running around on the emotional high of completing something they didn't think they would ever be able to do. All the while they are drinking beer, or worse, not drinking anything at all. Your body has just been drastically depleted of all its fuel. You need that fuel to help begin to repair muscle fibers that have been abused all day.

Self-myofascial release is also critical in reducing soreness within the body after intense exercise. Most people perform this style of self-massage with foam rollers, softballs or trigger point massage tools. By performing self-myofascial release after a race (or any high-intensity activity for that matter) you are able to aid recovery through applying pressure to specific areas within the body. Not only should this be done after a race, but it is also something you should be doing on a daily basis along with your training. Releasing trigger points not only leaves your muscles elastic and healthy, it also aids in re-establishing proper movement patterns.

### BIOGRAPHY

JOE DE SENA the co-founder of Spartan Race and author of the New York Times best-selling SPARTAN UP! A Take-No-Prisoners Guide to Overcoming Obstacles and Achieving Peak Performance in Life. Spartan Race began as an obstacle race based on the extreme spirit of the legendary Death Race, and has become a multimillion dollar global lifestyle company in less than 10 years. It was voted Outside magazine's Best Obstacle Race. In one year's time, Joe competed in the Raid International Ukatah in Canada; the IditaSport in Alaska; the Odyssey Adventure Race and the OAR Beast of the East, both in Virginia; the Raid the North Extreme in Newfoundland, the Adrenaline Rush in Ireland and the Discovery Channel World Championships in Switzerland. He resides in Vermont with his family. For more information, please visit [www.spartanupthebook.com](http://www.spartanupthebook.com).

HAVE A QUESTION FOR JOE DE SENA? EMAIL IT TO [EDITOR@FITNESSRXMAG.COM](mailto:EDITOR@FITNESSRXMAG.COM)







# CHAMPIONSHIP ABS

## WITH MEN'S PRO PHYSIQUE **STEVE COOK**

Optimum Nutrition athlete Steve Cook has been making waves in the Men's Physique division ever since earning his pro card in 2011 (becoming only the third Men's Physique pro ever). Most recently, he placed in the top five at the 2014 Olympia. Here, Steve chats with us about his six-pack dieting and training, and what it takes to be a champion.

**FRX: YOU PLAYED FOOTBALL IN COLLEGE, SO DID YOU HAVE A RIPPED MIDSECTION BACK THEN DUE TO THE TRAINING YOU WERE ALREADY DOING IN FOOTBALL? OR DID YOU HAVE TO WORK HARD TO TRAIN ABS SPECIFICALLY?**

**Steve:** Yes, I played football in college, but it was all about being big. The little ab definition I had was due to heavy compound lifts that required me to engage the core, and genetics. I rarely trained the abs on their own. Also, my diet wasn't conducive to a chiseled midsection.

**FRX: WHAT IS THE BEST WAY TO GET A SIX-PACK?**

**Steve:** The best way to get a six-pack is to have low enough body fat and properly worked abs. Abs won't show unless you're typically in the single digits of body fat. This means diet is more important than anything else. One must also train the abs effectively. I never train my obliques because I don't want them to get bigger, thus making my waist look thicker.

**FRX: SO THEN WHAT ARE SOME EXERCISES THAT ARE ESSENTIAL FOR CARVING A SIX-PACK?**

**Steve:** Crunches of all variations. Crunches and reverse crunches can and should be performed in various manners. Hanging, lying, seated on a bench and crunches with a rope are all variations that can be used depending on your core strength levels. I also like to use exercises like planks, windshield wipers and roll-outs to work the abdominal as a whole. These can be very taxing and work very well when done properly.

**FRX: DO YOU ALSO DO CARDIO, AND HOW OFTEN? HOW IMPORTANT IS CARDIO FOR A RIPPED PHYSIQUE?**

**Steve:** I always do a little bit of cardio no matter what my goal is. It's good for your heart and I like the feel of my lungs screaming. I generally use high-intensity interval training more in the off-season and less during contest prep. Cardio can and should be varied to keep things fresh and fun. I generally stick to around 30 minutes three to four days a week during contest prep, and will do as many as five sessions a week if I need to get lean quick.

**FRX: WHAT IS YOUR DIET LIKE?**

**Steve:** High protein, moderate carbs and moderate fats with enough training and cardio to be at a slight caloric deficit. Depending on what I'm getting ready for, I like to have a cheat meal once or twice a week. It's nice to get the extra calories, and also mentally it's a nice break from counting calories.

**FRX: WHAT SUPPLEMENTS DO YOU TAKE TO SUPPORT YOUR RIPPED AND LEAN PHYSIQUE?**

**Steve:** I use Optimum Nutrition's L-carnitine, BCAAs, CLA and yohimbine.

**FRX: HOW DO YOU STAY MOTIVATED?**

**Steve:** Staying motivated 100 percent of the time is impossible, but because I love exercising, feeling healthy and pushing my body, I don't have to work too hard to get motivated. If I'm having one of those days, I remind myself of my goals. I will also look at new reading material or pictures online of great physiques. After a few minutes, I'm ready to go!

**FRX: ACHIEVING A SIX-PACK IS SOMETHING MANY MEN WANT BUT FEW ACHIEVE. DO YOU HAVE ANY MOTIVATIONAL ADVICE FOR THESE GUYS WHO WANT TO GET IN SHAPE LIKE YOU?**

**Steve:** I would tell them not to get discouraged. Results don't happen overnight. If you stick with proper eating and train consistently, results will come. Enjoy the process, because chances are when you start seeing a little bit of definition in the abs, you'll only want to push harder and harder. It's important to be happy but not content with where you are currently.

**FRX: WHAT WOULD YOU SAY IT TAKES TO BE A CHAMPION?**

**Steve:** I think it starts with a vision. Everything I've ever accomplished, I mentally visualized it happening first. It's that vision and desire that will get you through the tough times. It's about never quitting on yourself, above all. ■

### STEVE'S TOP TIPS FOR A SIX-PACK

- Eat accordingly to lose body fat
- Train abs at least three days a week
- Keep reps moderately high (15-30)
- Train abs in a circuit fashion with minimal rest in between sets
- Avoid weighted oblique exercises if it makes your waist thicker

### STEVE'S HARDCORE WORKOUT

*Here is Steve's general pre-contest abs routine that ensures he hits all areas of the abs:*

- >HANGING KNEE RAISES, 3 sets to failure
- >ROPE CRUNCHES, 3 sets to failure (20-30),
- >WINDSHIELD WIPERS OR AROUND-THE-WORLDS, 3 sets of 10 reps
- >BROOMSTICK TWISTS, 3 sets of 50 reps

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### TRAIN HARD AND SUPPLEMENT SMART — PANTHERA SMART



# QUANTIFY THIS

For years now, two cultural phenomena dominated by type A personalities have been generating mountains of biometric data. One is CrossFit, where every workout of the day is designed to be “measurable, observable, repeatable.” Benchmarks are recorded. Detailed logs are kept, either in spiral-bound notebooks or online platforms like Wodify or Beyond The Whiteboard (not to mention dry erase scribbles on actual whiteboards).

There are two main reasons that CrossFitters are so disciplined about tracking results. The first is accountability. Knowing you have to put your times and weights on the board, or even write them in a notebook, introduces a level of accountability. You know when you’re in the suck that the outcome will be recorded, and it’s bulwark against slacking off. On the positive side, personal records are milestones to be celebrated, either privately (exclamation marks, stars, a “PR” tag), or shouted from the online rooftops.

The second reason CrossFitters keep the discipline of data entry is a sense that it might be valuable for analysis. In this spirit, many WOD record-keeping notebooks feature rating scales for sleep and nutrition, the idea being that someday you’ll flip back through the records for a blinding flash of the obvious: lousy sleep and bad nutrition compromise performance. With a bit of effort, athletes can suss out patterns in improvement that might give them a sense of when to take a rest day, or which kind of workouts to hit in the morning versus evening. The tantalizing promise of online WOD-tracking apps is data-driven recommendations along these lines.

Then there are the Quantified Self people, also type A and attracted to wearable gadgets: motion-tracking bracelets, smart watches, even a Kickstarter-funded Bluetooth-enabled fork that measures the time interval between “fork servings” (<http://www.hapi.com/>). Of

course, frequent biometric measurements are nothing new for people with chronic diseases who frequently monitor their blood glucose, blood pressure or cardiac arrhythmias. But now hipsters in the Bay Area are doing it, just to learn more about themselves.

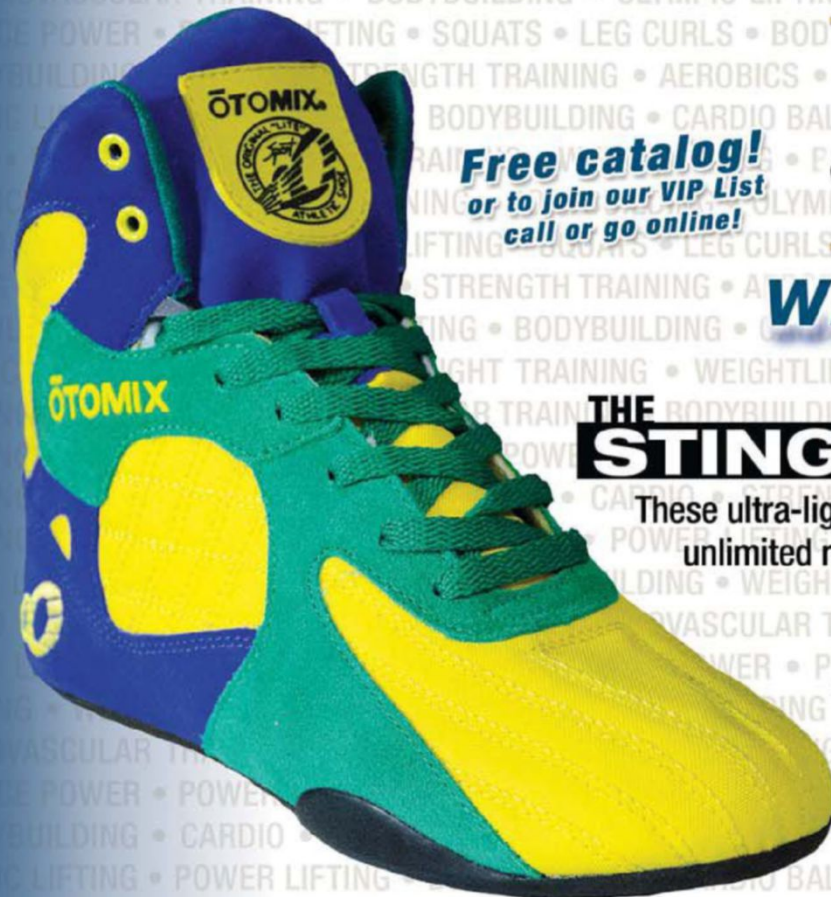
On the surface, CrossFit notebook-keepers and Quantified Selfies look alike. They measure themselves a lot. But fundamentally, they’re very different. CrossFitters are measuring results—athletic performance results—and trying to improve those results. Anything they record about sleep, nutrition, mood or phase of the moon is an effort to understand the inputs, so they can improve the output. Get a heavier one-rep-max clean and jerk. Then tweet about it. If CrossFitters’ empirical zeal teaches us anything, it’s that measuring results, the outcome you’re really interested in, drives commitment and improvement.

Inputs? Not so much. Steps-taken-per-day or intervals-between-fork-servings aren’t, in themselves, results that people care about. They may not even be the metrics that matter (intervals between fork servings of what, exactly?). Measuring process, not outcomes, is the essence of bureaucratic management. The novelty wears off. Ultimately, being able to focus people on outcomes, not just inputs, is what will separate the wearables that survive from a crowded field of motion-tracking Pet Rocks.

## BIOGRAPHY

J.C. Herz (@jcherz) is the author of *Learning to Breathe Fire: The Rise of CrossFit and the Primal Future of Fitness* (Crown Books), a book about the science and the psychology of physical intensity, and the link between CrossFit’s ritual intensity and the genesis of sport in ancient human society. *Learning to Breathe Fire* is a proud supporter of TeamRWB.org, a nonprofit dedicated to improving the lives of returning veterans through fitness. JC has also assembled a spirited tribe of CrossFit firebreathers on *Learning to Breathe Fire*’s Facebook page.





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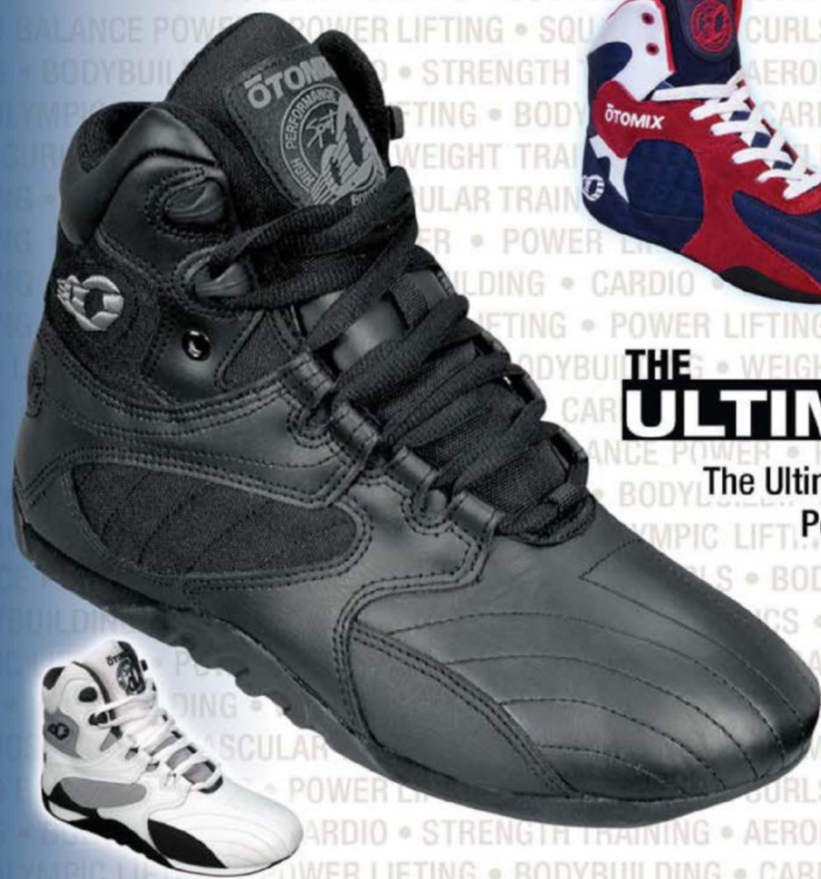
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# Run for your Life

**T**hese days, the focus of exercise seems to be more on improving one's physical appearance than on one's quality of health and longevity. This is precisely why high-intensity interval training (HIIT) is a hot topic in fitness and sports training, as the research has shown that it boosts sports performance and accelerates fat loss with fewer and shorter workouts than continuous (steady-state) cardio training.

Here's the reality: Not everyone is interested in boosting sports performance, as most working adults only play sports recreationally. And, although most people wouldn't mind losing some extra body fat, there are many who aren't willing to change their lifestyle and eating habits needed for fat loss, as one must regularly be in a caloric deficit (burning more calories than you consume) in order to lose fat. Many people are simply interested in exercising "just for the health of it." And, that's precisely who this article is for!

## LIGHT RUNNING CAN HELP YOU LIVE LONGER

A 2014 study published in the *Journal of the American College of Cardiology* investigated the long-term effects of running, as a leisure-time physical activity, on mortality. The researchers in this study found that running, even five to 10 minutes a day and at slow speeds (less than 6 miles an hour) is "associated with markedly reduced risks of death from all causes and cardiovascular disease."<sup>1</sup>

This is great news for those who may not be interested in trying high-intensity exercise or even going to a gym, for that matter. Or, for those beginners who may be looking to improve their fitness level before they join a gym, so they feel more comfortable while working out.

## RUNNING GROWS YOUR BRAIN!

Extending life expectancy isn't the only thing that should motivate sedentary individuals to begin some light running. Exercise also has more specific effects on the brain.

Scientists once thought that our brains stopped producing new cells early in life, but more recently it's been discovered that we continue to manufacture new brain cells throughout our lives. That said, the most potent stimulant of brain growth is, you guessed it: physical exercise.

Exercise increases levels of brain-derived neurotrophic factor (BDNF).<sup>2</sup> BDNF not only stimulates

the production of new brain cells and neurons, it also promotes their survival. Exercise especially generates neurons in the hippocampus, an organ associated with memory, and these new neurons have been demonstrated to enhance learning. Additionally, exercise raises levels of neurotransmitters, dopamine and norepinephrine, which facilitate attention and concentration and help "lock in" memories when they form.<sup>3</sup>

Put simply, at all ages, moderate physical activity seems to improve learning and thinking. This was highlighted in a large, five-year study published in the *Archives of Neurology*, which found that physical activity in later years was associated with lower risks of cognitive impairment, Alzheimer's disease and dementia in general.<sup>3</sup> Another study concluded that if exercise began by early middle age, it reduced the risk of developing Alzheimer's even further.<sup>4</sup>

## RUNNING REDUCES ANXIETY AND DEPRESSION

In addition to the fact that some light running helps to improve alertness, thinking and memory, studies dating back to 1981 have concluded that not

only can regular exercise improve mood in people with mild to moderate depression, but it also may play a supporting role in treating severe depression. Other research has even found that exercise's effects lasted longer than those of antidepressants.<sup>5</sup>

In regard to anxiety, research has shown that physical exercise reduces anxiety in humans by causing remodeling in the brains of people who work out. This evidence suggests that active people might be less susceptible to certain undesirable aspects of stress and anxiety than those of sedentary people.<sup>6</sup>

## THE DOWNSIDE OF LIGHT RUNNING

As we've established, adding in some moderate intensity running into your lifestyle, if you're not currently exercising, is an effective way to improve your overall health and longevity. Not to mention, it doesn't cost you anything to do—no gym membership is required—and it's a great way to get outside and do something active.

However, as with everything in life, there are pros and cons to light running. Since I've given you the pros, here are



the cons: Both jogging and running can be tough on your joints because for each step you take when running, there is an impact force of about two to three times your bodyweight. The impact force results from an abrupt decrease in velocity of the foot as it contracts the ground. And, in a 30-minute run, a typical runner will have about 5,000 impacts. So the accumulation of all those impacts are likely the root of the injury problem. The impact force and the ensuing impulse wave have been identified as potential factors resulting in injuries, such as stress fractures, shin splints, cartilage breakdown, low back pain and osteoarthritis, which have been associated with these large forces and subsequent impulse wave.<sup>7</sup>

## LIGHT RUNNING WORKOUT

Keeping all this information in mind, you'll want to do just enough running to stimulate the positive health benefits while minimizing the potential drawbacks. One of the ways to do this is to understand the difference between a *better* bout of exercise and a *longer* bout of exercise.

Instead of going out and trying to jog for 30 minutes, I recommend you, instead, go out and try to run one mile in as little time as you can. Of course, when you first begin, you'll take longer, as you will have to slow down or intersperse some walking as active recovery in between running. However, as your body adapts, you'll eventually be able to run the entire mile, without having to take any walk breaks in between.

Once you get to that point, where you're running the entire time, the next step in your progression is to work to beat your previous time, by running a little faster. You'll certainly get to a point where you are unable to finish the mile time any faster. It's at this point where you can begin to extend the distance you are running by adding another quarter mile, half mile and eventually another full mile.

That said, my recommendation is to focus more on the quality than the quantity (i.e., distance) of your running, as we are not talking about training to become a runner here; we are talking about running as a recreational exercise activity for general health benefits. So, I don't recommend going over three miles.

Focusing on the quality of your running instead of the quantity not only helps keep your workouts shorter, but also helps keep them safer because it minimizes impact on your joints, as you're not continually jogging for long distances.

## INDOOR WORKOUT ALTERNATIVE

If you're unable to get outside due to weather conditions, you can utilize a resis-

tance band anchored at ankle level, that's attached to a weight belt, which is around your waist. (You can purchase a weight belt and resistance bands at any sporting goods store.)

Facing away from the anchor point, position yourself so there is tension on the bands, so the bands are essentially pulling you backwards. Working against the band resistance, which creates a similar muscle activation pattern to when you are running uphill, perform what I call the "MSR" circuit. MSR stands for March, Skip, Run.

To perform the MSR circuit, you'll march in place for 30 seconds, followed by 20 seconds of skipping in place, followed by 10 seconds running in place as fast as you can. That's a total of one minute. As soon as you've done the 10-second run in place, you'll repeat the sequence by beginning with the march in place. The march in place serves as a nice active recovery bout after the higher intensity run in place that preceded it.

I recommend performing eight to 15 minutes total, which is eight to 15 rounds of the MSR circuit. You may not be able to do every round without stopping for a full rest or to get water, which is perfectly OK. Rest as much as you have to, and as little as you need to in order to get the job done. ■

Nick Tumminello is the owner of Performance University in Fort Lauderdale, Florida. He's also the author of the book *Strength Training for Fat Loss* and the DVD by the same name. For more information visit [www.NickTumminello.com](http://www.NickTumminello.com).

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# DEVELOP ARMS LIKE IRON PISTONS

## WITH LYING TRICEPS EXTENSIONS

Having strong arms is not always about biceps. In fact, the three-headed triceps muscle is more important to sports like football, tennis, skiing, swimming and basketball than the biceps ever will be. Perhaps every sport does not need your triceps to explode like erupting pistons, but having the strength to push off or extend the arm with a degree of power will provide a key to much of the success of these and other sports.

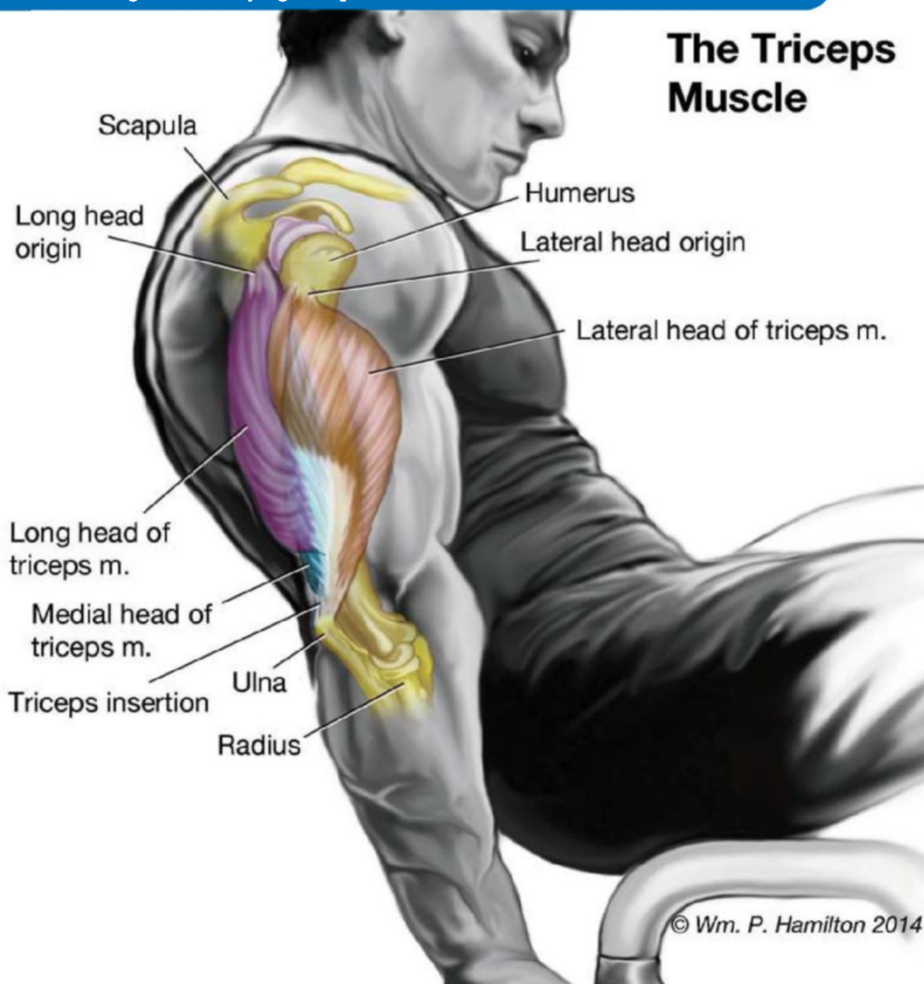
Upper arm strength is highly dependent upon the triceps brachii muscle because it actually makes up about two-thirds of the entire upper arm mass<sup>1</sup> and more cross-sectional mass and area means more strength. Thus, it is impossible to have a truly strong and effective arm without considering triceps development. When it comes to triceps builders, there are not many exercises that can match the overall strength, and mass building results as lying triceps extensions.

### MUSCLE STRUCTURE AND FUNCTION

The long head is the innermost of the three-headed triceps brachii muscle. It begins on the scapula (shoulder blade) just below (inferior to) the head of the humerus bone of the arm at the shoulder joint.<sup>2</sup> The muscle belly of the long head of the triceps forms a tendon that joins the tendons from the other triceps heads to make a common triceps tendon at the elbow. The triceps tendon crosses the elbow joint posteriorly and attaches on the ulna bone of the forearm near the elbow.<sup>3</sup> The lateral head of the triceps brachii begins on the posterior part of the humerus bone of the upper arm, about two-thirds of the way towards the shoulder joint. It runs on the posterior side of the humerus to connect to the triceps tendon.<sup>3</sup> The medial head of the triceps brachii lies between and deep to the long and lateral heads of the triceps. The medial head of the triceps brachii begins along the upper two-thirds of the posterior part of the humerus bone. Its fibers run down the arm to connect on the common triceps tendon which in turn, inserts on the ulna bone. The three heads of the triceps brachii muscle all extend the forearm (straighten the elbow joint). However, the long head of the triceps brachii can also extend the shoulder (pull the arm to the rear of the body), because the long head crosses the shoulder and attaches to the scapula. Both of these functions of the long head are activated by lying triceps extensions.

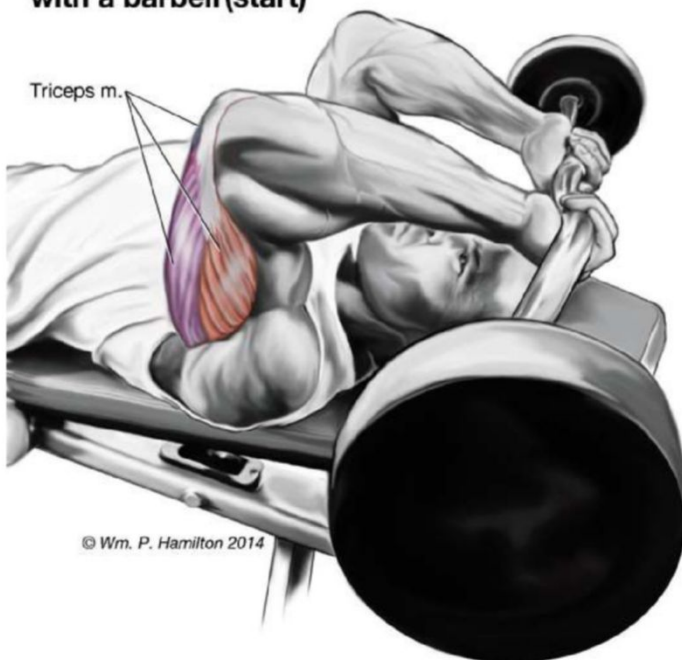
It is always a good idea to have a training

### The Triceps Muscle

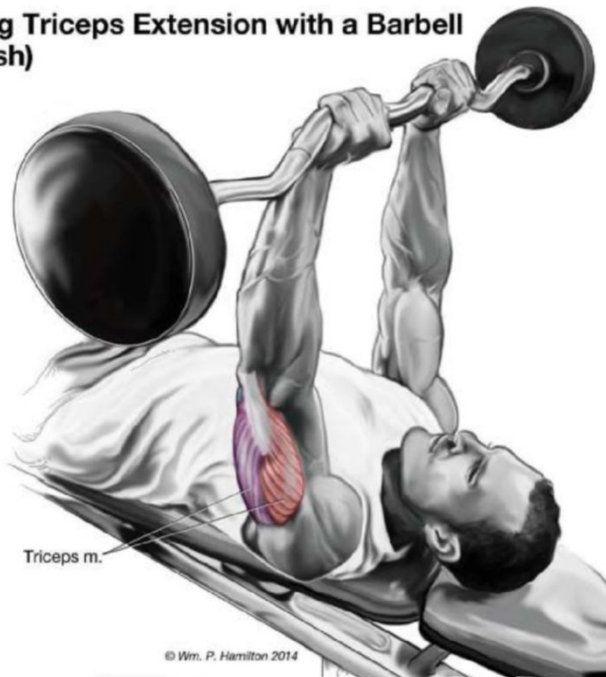




## Lying Triceps Extension with a barbell (start)



## Lying Triceps Extension with a Barbell (finish)



partner spotting you. In this way, if the weight gets stuck on the way up, you can get some assistance to prevent the bar from crashing back uncontrollably towards your head (which could have pretty devastating effects).

Heavy weights will recruit both the large and small muscle fibers and all three heads of the triceps, but it is a bit dangerous to go too heavy without a training partner. As the triceps begins to fatigue, the larger and stronger fibers of the long head come on board<sup>3</sup> to keep the bar moving. Lighter or medium loads for 12 or more repetitions will preferentially activate the medial and lateral heads of the triceps first<sup>4</sup> so you will have to push it hard (with a spotter) and approach

## LYING TRICEPS EXTENSIONS

There are several versions of lying triceps extensions with some styles being stricter than others. The version described here is very strict and it will require that you use a moderate weight. It is also important that you keep the bar under control at all times. Lying triceps extensions require forearm extension, so this exercise hits all three heads of the triceps.

1. Place a barbell on the end of a flat bench. Lie on the bench and grip the bar behind your head with a narrow over-hand grip (palms facing up). You can place both feet on the floor or on the other end of the bench.
2. Move the bar from the bench by extending the elbows and lifting the bar until it is directly over your eyes.
3. Do not pause at the top but immediately lower the bar towards your forehead by controlling the flexion (bending) of your elbows. When you lower the weight to the forehead, you should do this relatively slowly over three or four seconds.
4. Continue to lower the bar until it almost contacts your forehead. Control the weight so that it does not crash into your head.
5. Immediately extend your elbows so that the bar moves upwards until it is at a position that is over your eyes. In the top position the elbows should be almost straight. After reaching the top, control the descent of the weight back to the forehead and then repeat the next repetition until the set is complete.

fatigue to fully active the long head of the triceps along with the other two triceps heads.

When it comes to arms, your effort and consistency in training along with maintaining an excellent exercise style will determine if your triceps development will add to your strength and sports accomplishments. This includes making sure you warm up your elbows before hitting lying triceps extensions. Joint pain from sloppy training or skipping the elbow warm-ups will only bring you closer to a forced layoff, and nothing good will develop from that type of pain. On the other hand, the “good” pain, that is induced from a temporary lack of blood flows,<sup>5</sup> means that you are taking another step closer to the ultimate triceps, and persistent exercise will increase your pain threshold.<sup>6</sup> Nevertheless, do not push to the limits on lying triceps extensions without proper safety and good exercise form. After all, having a bar-induced crevice across your forehead from sloppy lifting, will not facilitate the evolution for creating iron triceps power pistons that will blast away any opponent on the sports field. ■

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# SUGAR SUBSTITUTES *LINKED TO OBESITY*

People eat too much. Oops, the truth spilled out. There are far too many calories consumed by the general population, and laborious effort has been trimmed to the bare minimum in many people's lives. Compound that with the decline in active recreation (e.g., exercise, sports), and the cumulative effect over time is... where we are as a society now. There are nearly twice as many overweight and obese people as normal weight.

People are educated about calories, and want to reduce how much they take in. They still want to enjoy the flavor and experience of eating, just in a way that is consequence-free. Further, the interest and benefits of reducing carbohydrate intake—especially sugar—has allowed the sugar substitute industry to enjoy a healthy market demand. Sugar substitutes are also called non-caloric artificial sweeteners (NCAS), though certain ones do contain a caloric value. There is a long history of NCAS use, with the first commercial product having been discovered more than 100 years ago—saccharin. Currently, there are a handful approved for use in the U.S., more familiar by their brand names (e.g.,

Sweet'N Low, Splenda, Equal). Most NCAS are chemically synthesized, though plant-extract stevia products are now available.

The premise is logical—replace sugar and its simple carbohydrate calories with a substitute that provides the same taste (sweetness) but lacks calories. Genius! Nature OUTSMARTED... not. Recall, the golden years of sugar substitutes occurred DURING the obesity crisis that continues unabated today. Society as a whole did not enjoy weight loss, or even a prevention of further weight gain, with the availability of “non-caloric artificial sweeteners.” IT GOT WORSE. Individually though, did people who used artificially sweetened products lose weight? Certainly, they must have since they were not consuming as much sugar or calories, right? Umm, maybe not... probably not... well, no, not really.

## THE BODY'S RESPONSE

A 2007 review considered the use of NCAS and weight management.<sup>1</sup> The authors attempted to clarify one area of confusion—that being, do people who use NCAS make up the calories in later meals? Well, there is conflicting evidence,

but cutting to the chase, people don't take in enough calories later on to make up for the calories they avoid from sugar by using NCAS. Not a whopping amount, as it results in maybe a half pound of weight loss per week based upon the calorie deficit. Of course, that assumes that the calories lost by substituting with NCAS actually make the diet hypocaloric. The review noted that NCAS consumers are generally people with a higher BMI, suggesting the calorie content of their diet is above their maintenance needs. So, with NCAS use, they are consuming fewer calories, but still too many. Perhaps gaining weight at a slower pace could be given and “honorable mention” award.

Researchers have rightly noted that NCAS are not just “sugar substitutes,” but chemicals that may have effects on various tissues, such as the intestines and brain.<sup>2</sup> One aspect questioned is the “enteral-brain axis” or gut-to-brain communication. When you taste something sweet, but don't get the increase in blood sugar and calorie availability, insulin release and suppression of fatty acid release that your brain expects from sugar—how does the body

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respond? It is confused, as sweet on the tongue should result in an influx of simple sugars that stimulate insulin release and begin to satisfy the appetite. Instead, it may lead to a greater demand for eating, as the body is told there is nutrition coming by the tongue, but not seeing it as available calories. Though the data is sometimes conflicting, it also seems that the intense sweetness triggers the “reward” pathways in the brain, and in susceptible individuals this results in bigger meals or more frequent food-seeking behavior (e.g., snacking).<sup>2,3</sup>

Bear in mind, the “five senses”—sight, smell, sound, touch and taste—are the brain’s direct connection with the environment. If the brain senses food by sight, taste or smell, it generates hunger and turns on behavior “programs” that result in eating. Fast food restaurants know this, which is why they have brilliantly lit marquee signs and pipe the smell of french fries into the exhaust vents to be inhaled by drivers passing by. The sweet taste of sugary icings is what drives most to eat doughnuts, not the cake. Now, imagine if you smelled french fries, and the aroma was coming from an auto parts store. You don’t forget your hunger; you go looking for a nearby McDonald’s. If your brain tastes sugar, and it gets saccharin or aspartame, it sends you off to find food.<sup>4</sup>

The NCAS industry hasn’t been bothered by this, though, as people have a strong desire to consider themselves as iron-willed, capable of eating sugary snacks if they can indulge in a sweet, low-calorie treat instead. In fact, many people can utilize NCAS-sweetened beverages in place of a sugar-sweetened soda or other high-calorie beverage.<sup>5</sup> [NCAS work best in replacing the sugars in beverages, as they are not suitable for high-heat cooking, and the “empty” calories are present in beverages. “Sugar-free” foods often have similar calories due to the use of non-sugar thickeners to provide the “mouth-feel” expected from sugary foods.]

## EFFECT ON METABOLISM AND GUT MICROBIOME

This would mean that NCAS are a valuable tool to losing weight, right? What do you think? New research (appearing after most NCAS have gone off-patent) suggests that NCAS might actually be sabotaging your metabolism. Our body is host to many bacterial colonies, so many that the number of bacteria cells actually outnumber the “human” cells. The gut is a major locale, but as these bacteria come from nature, they work. In healthy, non-obese people, the bacteria help maintain the metabolism and health of the person, including ways that function like another en-

docrine organ. The gut “microbiome” has been shown to be altered by the diet, and the changes alter the human metabolism.<sup>6</sup> But NCAS are not “food,” just sweeteners, so they should not affect the gut microbiome, right? Have you learned yet?

NCAS are not sugar, and their effects as chemicals have been sparingly researched (perhaps intentionally). However, now that research published in the eminent journal *Nature* has surfaced, it may be time to look at those little packets as more than pretty pink, blue and yellow sachets of sweetness.<sup>6</sup>

**The golden years of sugar substitutes occurred DURING the obesity crisis that continues unabated today.**



A series of experiments revealed some exciting (for scientists) findings. First, in mice given one of three NCAS for a week, compared to mice given water, there was a distinct and rapid onset of insulin resistance. This means they could not shuttle glucose (blood sugar) into their muscles and other tissues as well. The researchers suspected this was due to a change in the gut microbiome, so they treated the mice with antibiotics to kill all the gut bacteria, and the negative change was gone. Genetic analysis of the gut microbiome showed that the NCAS-fed mice developed an “unhealthy” population. Further, when the scientists transplanted feces (poop) from the NCAS-fed mice to a separate group of mice that were raised without a gut microbiome, the same changes occurred in the mice who received the fecal transplant—without being exposed to NCAS. This supports the idea that NCAS alter the gut microbiome in an unhealthy way, rather than affecting the organ function in the mouse.

Then, the researchers looked for evidence of the same effect in humans. Using

data from an ongoing nutritional study revealed that NCAS users had a higher body mass index (BMI), waist-to-hip ratio, increased fasting glucose and HbA1c 9 (a marker of long-term glucose control, so higher is bad), as well as a gut microbiome that differed from those who do not consume NCAS. Of course, it is possible that those who are already obese are more likely to use NCAS as part of a weight-loss effort.

## SABOTAGING WEIGHT-LOSS EFFORTS?

The authors tried to repeat a mini-study on humans, similar to that performed on the mice. Human subjects who did not consume NCAS routinely were given saccharin for a week, and tested before and after for signs of negative changes in how they handled sugar (aka glucose tolerance or insulin resistance), or changes in the gut microbiome. In four of the seven subjects, changes were noted. Finally, the researchers transplanted feces from subjects who showed changes, using stool samples from the day prior to receiving saccharin and after seven days of saccharin use. The pre-saccharin stool did not cause any negative changes in the mice, whereas the mice who received stool from the same human subjects after seven days of saccharin use developed signs of glucose intolerance. The pre- and post-saccharin feces had significant differences in the bacteria present, after just seven days.

While certainly not enough evidence for a conviction, it does suggest that NCAS may not be entirely benign as a food additive. NCAS may even be sabotaging weight-loss efforts in those who depend upon diet foods and beverages to a great degree. ■

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# PAUSE SQUAT TO UP YOUR SQUAT MAX

If you follow me on social media, you find out real quick that I am a full-fledged squat maniac. I squat every single day now and wholeheartedly believe in the benefits, whether it's simply completing the challenge of it or the noteworthy strength gains I've made while getting leaner.

But there's always a way to up the ante, and I've tried to find a way to do that—even while maintaining my squat everyday mantra. In pause squats, I've definitely found a way to get a little crazier and it has become a huge part of my daily squat arsenal. They are difficult and they can be humbling, but adding pause squats into your routine can make a huge difference in any program, whether you're squatting every day or once a week.

My interest in pause squats came about when I started following my favorite Olympic weightlifter on Instagram—2008 silver medalist Dmitry Klokov. Besides being an absolute animal in the gym when it comes to pretty much any lift, Klokov is a big advocate of pause squats with very heavy weight. Now, his heavy weight and everyone else's heavy weight is going to be vastly different, but the message remains the same—using heavy pause squats in your routine is going to lead to big gains when it comes to your regular squat.

In my opinion, a major reason that pause squats are so effective is because they help you get really comfortable in the most uncomfortable part of the lift. Take any badass in the lifting game—and Klokov certainly qualifies as one—and they are always able to take the worst part of any lift and make it as comfortable as possible.

It takes some serious work and some major grinding through heavy weights, but pause squats can do that for you. But it's not simply doing them, running through the motions and expecting your regular squat to fly up. You're going to have to raise your intensity level, dial in your technique and learn how to power through a dead stop in the squat hole. There's nothing easy about pause squatting a heavy weight, but the sense of satisfaction can be immense. To be honest, I've also noticed a huge improvement in my Olympic-style squat and my bottom position flexibility.

The pause squat forces your body to be in the proper position, but you also find

## MY BEST PAUSE SQUAT DAY – BODYWEIGHT OF 190 POUNDS

BAR: 2 SETS OF 10 REPS (SOLID DEAD STOP IN THE BOTTOM FOR AT LEAST ONE SECOND)

95 POUNDS: 2 SETS OF 5 REPS

135: 2 SETS OF 5

185: 1 SET OF 3

225: 1 SET OF 3

275: 1 SET OF 3

315: 1 SET OF 3

365: 1 SET OF 1

### BACK-OFF SETS

315 FOR 1 WITH 5-SECOND PAUSE

275 FOR 1 WITH 10-SECOND PAUSE

225 FOR 1 WITH 30-SECOND PAUSE

where your restart power is at the bottom of the squat. It's going to be different for each person, but finding it can help you generate even more power, which obviously leads to a bigger squat. The pauses, in addition to just flat out making you stronger, can help you discover all sorts of little intricacies at the key spots of a squat, another reason they are so beneficial.

My entire goal is to be a freak out of the hole of my squat and, to be honest, it's not going to be possible without adding in some pause squats. I've applied pauses to both my front and back squat to improve my overall squat game, but the benefits don't just stop with that lift. Pause squats have had a direct influence on my deadlift training simply by making my lower back so much stronger. I bought some Reebok Olympic shoes, watched some Instagram videos and started squatting every day nearly 200 days ago and,

without a doubt, adding pause squats into the mix has been one of the most important parts of this journey.

If you're interested in applying them to your squat game, check out some of my videos on Instagram at @musclepharmpres and also check out Klokov's as well. I also listed a progression of an example pause squat day above, working up to a daily max and then including back off sets with longer pauses (sometimes up to 30 seconds). The reload of the weight in addition to being warmed up allows you to hold that pause for a much longer time after you hit that max weight. It also helps make you a freak out of the hole and that's pretty much what we're all after.

I've found out that this helped make me pretty damn strong, and I'm very confident it can help your squat game a great deal as well. So take a second (or two or three or even more), pause, and get to work. ■



## BIOGRAPHY

Cory Gregory co-founded MusclePharm with Brad Pyatt in 2008 and serves as Executive Vice President. A former underground coal miner, Gregory worked diligently to save money to realize his dream of opening his own gym by the age of 20. In the last 15 years, he has gained extensive experience and has received a number of accolades within several aspects of the fitness industry. Obtaining an Exercise Specialist certificate from Columbus State, Gregory is also NESTA nutrition coach certified and Westside Barbell certified. In addition to his in-depth knowledge of bodybuilding and nutrition, he is a CrossFit Level-1 trainer further helping MusclePharm's athletes and ambassadors achieve their fitness goals. Gregory prides himself on embodying the MusclePharm culture, as he has been featured on the cover of top fitness magazines, including FitnessRx. Weighing just 208 pounds, he has achieved a powerlifting total of 1,755 pounds, culminating in a career-best 700-pound squat. Most recently, Gregory was added to the Arnold Schwarzenegger Fitness Advisory Board.







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**W**ith the holidays in the rearview mirror, it's time to build as much muscle mass as possible. that you can't build muscle while cutting; I'll leave this topic for my book, *The G.A.I.N. Plan*.

Although this article is intended to point out the best supplements for building mass, we can't proceed without a little visit with Captain Obvious. Building muscle requires the right quantities of whole-food nutrition, eaten at regular intervals throughout the day. I will always recommend a minimum of a gram of protein per pound of body-weight, plenty of complex carbohydrates and healthy fats. The muscle growth machinery needs to be switched on every three hours with a meal or supplement. Adequate carbohydrate and fat calories will optimize the hormonal milieu with proper rest and recovery. Get your blood work, optimize your hormones, and train smart.

With all that being said, it is time to get to the topic at hand: supplements. When it comes to supplements for building muscle, we need to find combinations that work together. Why stack supplements that are counterproductive? Why take a fat burner when you are trying to gain weight? Why take two supplements that do the same thing?

We also need to use high-quality supplements that actually work! Even if you choose a supplement that has great science behind it, if you choose a brand of ill repute, you may end up with an under-dosed or toxic supplement. Choose wisely and consider the following supplements to maximize muscle growth.

### 1. WHEY PROTEIN

Whey protein is the branched-chain amino acid-rich milk protein that is easily digested and rapidly absorbed. As we have discussed in previous columns, whey is particularly endowed with the amino acid leucine. Leucine is a very special branched-chain amino acid, thought to be the key that turns on muscle protein synthesis through the switch called mTOR. As you will soon learn, there are many ways to turn on mTOR, a critical step in building muscle.

Gram for gram, because of its high leucine concentration, whey is more adept at building muscle than soy, casein or wheat protein. It is thought that most training with heavy weight will optimize muscle protein synthesis with approximately three to four grams of leucine per meal. That would suggest that consuming 30 to 40 grams of whey protein will help build mass. Combining whey protein with an equal amount of carbohydrate in a post-workout meal turns on mTOR through leucine and a concomitant boost in insulin. "Whey is the way" to build muscle.

### 2. HMB

To build muscle, not only do you need to turn on muscle growth, but you also need to prevent muscle breakdown. Intense over-reaching training is intended to break muscle down, with the hopes that proper recovery will build more muscle than when you started. HMB, or beta-hydroxy-beta-methylbutyrate, is a metabolite of the

# THE BEST SUPPLEMENTS FOR BUILDING MUSCLE MASS



amino acid leucine that is particularly good at preventing muscle breakdown. At three grams per day, I believe it should be a part of any intense training program.

HMB can stimulate muscle protein synthesis by up to 70 percent (leucine can up to 110%) while also decreasing muscle breakdown by up to 57 percent.<sup>1</sup> Recently, studies have suggested that HMB in its free acid form may be absorbed faster and may even be more effective than the calcium HMB form.<sup>2</sup> Further marketing-biased rhetoric has produced a more recent study in rats looking at the absorption kinetics and bioavailability of HMB free acid versus calcium HMB (sold by Abbott).<sup>3</sup> The study from Abbott Nutrition Research and Development suggests that their product, calcium HMB, reaches higher plasma concentrations and is cleared slower than HMB free acid. Whether one is more effective than the other in building muscle will take a placebo-controlled, head-to-head study by unbiased researchers.

### 3. PHOSPHATIDIC ACID

Phosphatidic acid (PA) is a component of your cell membranes. Mechanical contraction of muscle is thought to stimulate enzymes that cleave PA from phosphatidylcholine in muscle cell membranes, increasing its levels in the cell. PA is then able to turn on mTOR through a domain that is separate from growth factors like IGF-1 or the amino acid leucine. Therefore, it has been suggested that PA may act synergistically with leucine in boosting muscle growth.<sup>4</sup>

In a recent study on muscle cells in laboratory cultures, a soy-derived PA was incredibly powerful at activating mTOR.<sup>5</sup> Follow-up studies on ingestion of 750 milligrams of PA per day versus a placebo with eight weeks of resistance exercise demonstrated significant improvements in the PA group.<sup>6</sup> The subjects on PA gained more lean body mass, more muscle girth, and more strength. This is a supplement that needs to be studied in combination with whey protein and HMB.

### 4. CREATINE

Leucine, HMB and creatine are so powerful at building and maintaining muscle that a recent study explored their effects on muscle cells in culture.<sup>6</sup> The scientists showed that these three compounds can prevent the actions of the muscle growth inhibitor that we all know very well: myostatin. Previous studies have also shown that creatine can reduce myostatin levels and even boost the conversion of testosterone to the more potent dihydrotestosterone (DHT).<sup>7,8</sup> The elevation of DHT was almost 60 percent with the 25-gram-per-day loading phase at one week, and stayed 40 percent elevated for another seven days at a maintenance dose of five grams per day.

Creatine is clearly a strong performance-enhancing supplement, and is one of the most well researched of all sports nutrition products. There are many other versions of creatine, but creatine monohydrate (CM) appears to be the most consistent and effective. CM is most often loaded at five grams, four times per day for seven days, and then maintained at five grams per day. Contrary to broscience, one does not need to take a "creatine holiday" unless of course you get explosive bowel habits. In that case, your significant other may force you to take a break.

### 5. BETA-ALANINE

Intense training builds muscle. Therefore, there are a lot of supplements out there to help improve your ability to push muscle to new limits. Beta-alanine is a supplement that helps you to train harder in the gym, especially in combination with creatine.<sup>9</sup> Beta-alanine supplementation is a more efficient way to build up muscle carnosine levels than by supplementing with carnosine itself. Carnosine buffers acid in muscle, improving contractile force and limiting fatigue.

Moderate- to high-quality evidence suggests that beta-alanine supplementation increases total work done, power output, physical working capacity and fatigue threshold. Four moderate- to high-quality studies demonstrated an increase in lean mass in beta-alanine-treated groups compared to placebo groups.<sup>9</sup> A recent dosing study published in the scientific journal of the American College of Sports Medicine suggested that ~1.2 grams of beta-alanine per day was optimal for maintaining up to 50 percent more muscle carnosine over baseline, after a six-week loading phase of 3.2 grams per day (four x 800 mg doses).<sup>10</sup>

### 6. CITRULLINE/ARGININE

Citrulline can be produced in the gastrointestinal tract from glutamine or from the release of nitric oxide (NO) from arginine. When citrulline is absorbed, it clears ammonium and lactate from the blood via conversion to arginine in the kidneys. In this way, citrulline actually augments arginine levels in the blood. Presumably, this augments your ability to produce NO. The malate in "citrulline malate" supplements is also an energy intermediate that may augment ATP energy production.

Studies have shown that citrulline malate can increase the amount of work performed during strength training, and mitigate delayed onset muscle soreness.<sup>11</sup> In a study of experienced weightlifters, eight grams of citrulline malate given 60 minutes prior to training led to significant improvement in the number of repetitions performed on the hack squat, leg press and leg extension to failure.<sup>11</sup> Citrulline malate at the same dose also im-

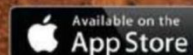
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proved upper body performance and recovery in another study.<sup>12</sup> Don't forget: your green leafy veggies and beetroots are your best sources of dietary nitrates for NO production!

## 7. MELATONIN

The next two supplements are actually hormones. Melatonin is a hormone secreted by the pineal gland in circadian rhythm to elicit sleep physiology. Supplementation with melatonin has the ability to improve deep sleep onset. It is during this deep sleep that your body undergoes reparative processes to recover from your training, in addition to releasing growth hormone.

Research has demonstrated that five milligrams of melatonin supplementation can improve growth hormone levels.<sup>13</sup> In addition to many other antioxidant and metabolic effects, melatonin, when given in the evening, may be beneficial to muscle-building. Don't neglect your sleep for optimal recovery from your training to build muscle.

## 8. VITAMIN D

Vitamin D is a hormone made from cholesterol, just as testosterone. Vitamin D also turns on a nuclear receptor just like the anabolic steroids. You must think of this "vitamin" as a vital hormone. Its function goes way beyond simply improving calcium absorption for healthy bones.

Multiple studies have shown how important vitamin D supplementation is for improving muscle strength, especially in vitamin D-deficient older individuals. Vitamin D levels in the blood have been correlated to muscle cell contractility, strength and postural stability. Vitamin D deficiency has also been correlated to insulin resistance and metabolic dysfunction. Supplementation with vitamin D3 at 1,000 to 2,000 IUs per day may improve the actions of leucine and insulin in boosting muscle protein synthesis.<sup>14</sup>

## 9. ANABOLIC FATS

Despite the belief that fats are bad for us, science is finally starting to accept the concept that fats are an essential macronutrient. Limiting fats in our diets for fear of heart disease has led to a vilification of any fat that is not from fish. The fact of the matter is that fats come in all shapes and sizes with different effects on our metabolism. Granted, trans fats, or hydrogenated vegetable oils, are quite metabolically toxic and should be avoided.

It has previously been suggested that arachidonic acid may be a pro-inflammatory omega-6 fatty acid that could be harmful to your health. In reality, arachidonic acid has important metabolic functions such as producing endogenous mediators of muscle growth. Arachidonic acid derivatives can turn on mTOR much the way that leucine does.<sup>15</sup> Furthermore, the essential fatty acids, including omega-3 fish oils, are important mediators of repair and recovery

from exercise. Don't believe the "low-fat" diet lie; consume plenty of healthy fats from dairy, fish and grass-fed meats.

## 10. CAFFEINE

Caffeine is the quintessential component of all pre-workout supplements. Many designer stimulants have come and gone, but

caffeine is here to stay. A grande cup of Starbucks coffee is loaded with plenty of caffeine (330 mg) and antioxidants to boost your training in the gym. Studies suggest that caffeine limits perceived exertion, improves focus, and helps with muscle recovery.<sup>16</sup>

Remember, pick your supplements wisely. Stick to trusted brands and avoid vague labeling. More isn't always better. The supplements listed here are my favorites. There are many more

out there with more or less conflicting studies. Stay tuned to this column and my blogs and social media feeds for further research updates @victorprisk on Twitter, Instagram and Facebook. ■

Dr. Victor Prisk is a board certified orthopaedic surgeon and IFBB professional bodybuilder in Pittsburgh, PA. Dr. Prisk is an active member of the GNC Medical Advisory Board and creator of the "G.A.I.N. Plan." He is an NCAA All-American gymnast, champion swing dancer and NPC Welterweight National Champion.

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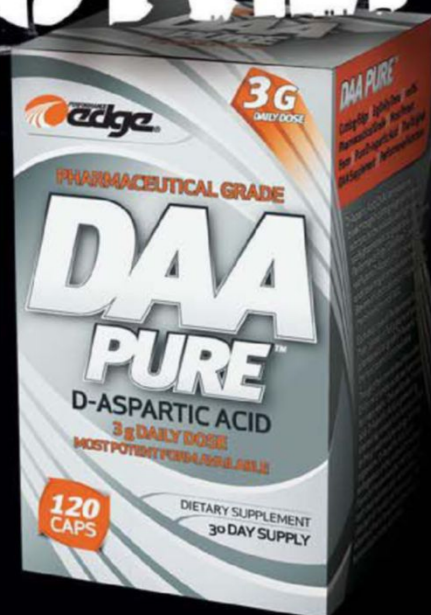
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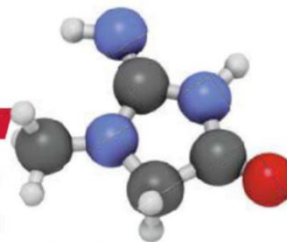
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# CREATINE:

## WHAT IS THE BEST FORM?



The supplement industry is in constant flux. There are new products and formulations introduced to the market every day. However, it is very rare for a product or especially an ingredient to create noteworthy evolution in supplement performance. Arguably, the greatest leap up this axiomatic evolutionary ladder occurred with the advent of creatine supplements in the 1990s. Creatine has proven over and over to be “the real deal” in clinical research and bro-science. It’s a muscle-building, performance-enhancing supplement that nearly all athletes should use.

Many innovative forms of creatine have hit the market since the introduction of creatine monohydrate (CM) in the early 1990s. Companies bank on the fact that creatine, at least in monohydrate form, is a reliably effective supplement. Athletes and even average consumers are familiar with the name “creatine,” whether they think it is a performance-enhancing drug or a healthy supplement. In order to create new buzz about creatine, many different angles have been used.

First, creatine can come in various physical forms. These could be liquids, powders, gels, chews or pills. These products may mix creatine with other supplements in the hope to increase absorption or effectiveness. Second, creatine comes in different chemical forms (i.e., salts and esters). Also, because creatine is technically an amino acid, it can be combined with other amino acids to make a peptide chain (di- and tri-peptides). We will go into more detail about this in the content that follows. Third, it has been suggested that these various forms of creatine act physiologically different than CM. Claims of better absorption, greater strength gains, or fewer side effects are used in marketing to differentiate products from CM. With all of this variety, has any form been shown to outperform or even match the performance of original CM?

### STRUCTURE AND FUNCTION

For those who aren’t as familiar with creatine structure and function, I will provide a brief review. Creatine is made in the body from the amino acids arginine, glycine and methionine. Creatine is not an essential nutrient, but methionine is an essential amino acid that must be obtained in the diet. Otherwise, fish, meats and supplements act as an excellent source of creatine. Vegetarians (especially vegans) can be relatively deficient in their creatine intake.

Creatine is involved in energy production in many tissues. In muscle and brain cells, creatine is converted to creatine phosphate to act as a phosphate donor to recreate needed ATP (adenosine triphosphate) from ADP (adenosine diphosphate). Creatine phosphate makes sure that ATP is immediately available for short bursts of energy; a couple of examples would be a 30-second sprint or one set of lifts in the gym. Deficiency of creatine in a vegetarian diet results in poorer results on tests of cognitive function, with improvements in memory upon supplementation.<sup>1</sup> Levels in muscle can be increased by up to 40 percent with dietary supplementation.<sup>2</sup>

It can be said that creatine is one of the most studied supplements on the planet. It has also been said that CM is the most effective, safe

and well-studied performance-enhancing supplement.<sup>3</sup> Studies show that using creatine enhances strength, speed and even endurance. It was initially thought that based on creatine’s mechanism of action, it would only be useful in buffering short bursts of energy. Research has demonstrated how increasing creatine stores through supplementation can improve endurance performance by increasing blood volume, glycogen storage and respiratory efficiency.<sup>3</sup>

### MORE LEAN MUSCLE MASS

More important is creatine’s ability to improve lean muscle mass and muscle hypertrophy. Supplementation with creatine, protein and carbohydrate seem to be ideal for muscle growth. Creatine, when combined with exercise, induces an anabolic environment whereby changes in gene expression occur. This correlates well with notable rises in muscle IGF-1 production by muscle. In one study, creatine induced greater than 20 percent increases in IGF-1 and two times greater increases in lean body mass. More recent studies demonstrated the added antioxidant and DNA-protective effect of creatine supplementation, which presumably improves recovery.<sup>3</sup>

With this information in hand, it is clear to see why CM has become such a popular supplement. So why change it? In order to keep customers interested in the latest and greatest supplements, manufacturers have made many forms of creatine. Creatine is a weak base that can combine with acids to form a “salt.” Creatine salts like creatine malate, creatine citrate and creatine tartrate have all been marketed as sports supplements. These salts

have unaltered creatine that breaks off their acid moiety in the body, releasing creatine to form creatine phosphate. Other derivatives such as creatine esters (creatine ethyl ester; CEE) or creatine alcohols (creatinol-O-phosphate) have also been marketed. However, these derivatives are chemically altered and it can’t be presumed that they become creatine in the body.<sup>2</sup>

### CREATINE SALTS

Interestingly, some companies suggest that some of these salts have better absorption characteristics than CM, and therefore you can take less. However, compared to CM many of the salts actually have less creatine per gram than CM. For instance, the salts creatine malate, citrate, and pyruvate have ~25 percent to 30 percent less creatine per gram than CM. Even if absorption is better than CM (i.e., creatine pyruvate is ~15% better absorbed) the amount absorbed is still 10 percent less than CM. Further, just because creatine is absorbed faster doesn’t mean that it will work better. You should load your creatine at 20 grams per day (five grams, four times per day) for up to a week anyway.

On the other hand, co-consumption of carbohydrate, low-dose D-Pinitol and protein can improve creatine retention.<sup>4</sup> Whether these boost the performance benefits of the CM is unproven. It had also been previously suggested that co-ingestion with Russian tarragon (*Artemisia dracunculus*), an extract that has insulin-like activity, could improve creatine loading.<sup>2</sup> However, recent data shows that this fails to improve sprint performance over CM alone.<sup>5</sup>

Research has even explored supplementation with the creatine precursor guanidinoacetic acid (GAA). Much like beta-alanine is a



precursor for carnosine, GAA is methylated to become creatine. Supplementation with GAA is well absorbed and capable of increasing creatine levels.<sup>6</sup> However, supplementation results in elevations in homocysteine levels, which has been associated with vascular disease. GAA's ability to boost performance is yet to be determined.

## LIQUID AND 'ALKALINIZED' CREATINE

Some companies have suggested that their form of creatine might be more stable in liquid form. The problem with creatine in solution is that it is non-enzymatically converted to inactive creatinine unless the pH is very low (very acidic) or very high (alkaline). Creatine salts such as creatine citrate do not improve creatine stability in solution. Studies also show that CEE is also less stable in solution than CM.<sup>8</sup> In fact, CEE is so unstable that it is more likely to become creatinine in stomach acid. Studies confirm that CEE has lower bioavailability than CM, and may even be toxic by increasing creatinine levels in the blood.<sup>7</sup> Other companies have used combinations of creatine with an amino acid like leucine or glutamine (leucyl-creatine). They have been able to demonstrate greater stability in acidic solutions like ready-to-drink formulations, but the data is limited to their patent (#US8445466).

The other product that hasn't necessarily been proven to work is the patented "alkalinized" creatine. In fact, because the pH of the stomach is so low (acidic), creatine is actually stable and absorbed well (under pH of 2.5) without being converted to creatinine. It takes very high (alkaline) pH's to make creatine stable at the other end of the spectrum. However, the addition of alkalizing agents can potentially bring up the stomach pH, but not enough to make it alkaline. Therefore, alkalized creatine may actually increase the breakdown of creatine to creatinine in the stomach.<sup>8</sup> Studies show that CM is nearly 99 percent absorbed intact without alkalization and without significant side effects. Direct comparison of alkalized creatine and CM demonstrated inferior performance of the alkalized creatine in body composition and strength.<sup>9</sup>

## IMPROVED PERFORMANCE

With regard to performance improvement, creatine salts such as creatine pyruvate and creatine citrate improved endurance in one study, but the study didn't have a CM group to compare.<sup>10</sup> It is thought that some of the improvement in performance could be contributed by the salt of pyruvate. As already mentioned, CEE did not increase muscle creatine levels or improve performance, and alkalized creatine was inferior to CM. Creatine alcohols have very little data to support any effect after oral supplementation.

A study in the *Journal of Strength and Conditioning Research* examined the effects of polyethylene glycosylated creatine (PEG-creatine) supplementation on anaerobic performance measures, muscular strength and endurance (bench press and leg extension), and body composition.<sup>11</sup> This study involved a randomized, double-blind, placebo-controlled design of 77 adult men supplemented with 1.25 or 2.5 grams of PEG-creatine per day and then tested for improvements at 28 days. Compared to placebo, both doses showed significant improvements in lower-body vertical power, agility, change-of-direction ability, upper-body muscular endurance and body mass. Additionally, the PEG-creatine treatments showed very little weight gain, so this form of creatine may be of benefit to those in sports with weight classes. This data con-

firmed previous studies that lower doses of PEG-creatine could be as effective as five grams of CM.<sup>12</sup>

## BE A SMART CONSUMER

A review article by Jäger et al. in 2011 suggested that some of the various creatine salts and modified creatines may be on the market without approval from the U.S. Food and Drug Administration (FDA) or even illegally. The FDA requires filing of a new dietary ingredient notification in the case of the chemical modification of creatine.

Without evidence of safety, the FDA feels companies may be putting Americans at increased risk of illness or injury. At this point, it is very important that we all become smart consumers of nutritional supplements and perform our own "due diligence" before putting ourselves at risk with any supplement. Consider the source of the supplement and the possibilities of misrepresentation by the manufacturer.

In summary, creatine has revolutionized the supplement industry. The combination of creatine, carbohydrate and protein is an essential component of any mass-building routine. Creatine monohydrate is the gold standard, but other forms of creatine have their place in the market. Perhaps more importantly, creatine monohydrate supplementation is safe and very effective. ■

Dr. Victor Prisk is a board certified orthopaedic surgeon and IFBB professional bodybuilder in Pittsburgh, PA. Dr. Prisk is an active member of the GNC Medical Advisory Board and creator of the "G.A.I.N. Plan." He is an NCAA All-American gymnast, champion swing dancer and NPC Welterweight National Champion.

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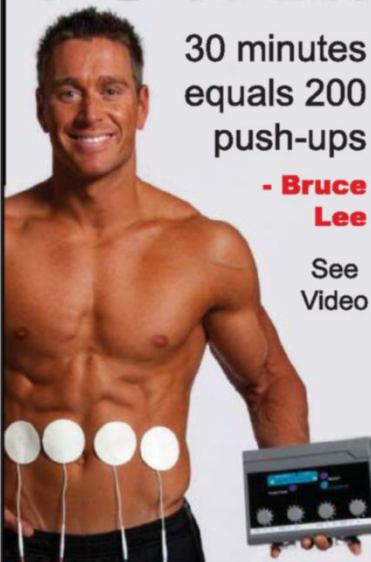
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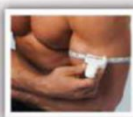
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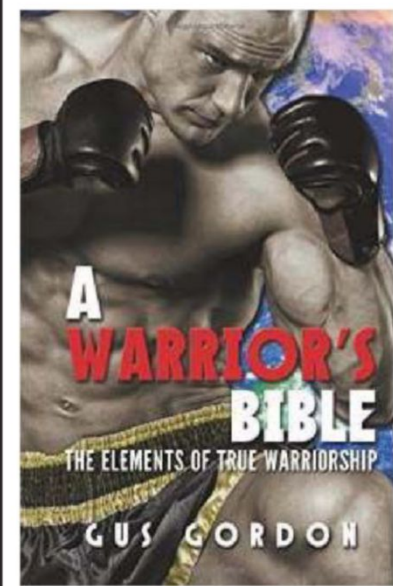
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# PRIDE AND PAIN

**HOW DO YOU CONSISTENTLY EAT CLEAN WITH NO CHEATS? OR DO YOU HAVE CHEAT MEALS AND HOW OFTEN? I FEEL AFTER FOUR OR SO DAYS OF EATING CLEAN, I DESERVE TO HAVE A TREAT.**

I eat to fuel the body; I don't eat to satisfy an appetite! I look past the food to what the food provides before eating something. I see a pizza in front of me as well as a chicken breast, and I see that both fill me up the same. I see that one keeps me on track to the higher benefits of life that few ever reach, and the other prevents my dreams from becoming a reality. I look at both as a decision of who I want to be, not what my taste buds call out for. If I eat the pizza, I get a quick sense of satisfaction that is followed by regret and a lethargic nature, as it is a bad fuel. After eating the pizza, I mentally feel like I let myself down and I feel disappointed and have a negative attitude. OR, I eat the chicken breast— and afterwards I'm just as full but I feel strong.

To give up a dream to enjoy what any common man can encounter through taste is a worthless endeavor for me. I would much rather sacrifice today for what I feel tomorrow's growth can become. The taste of food is not enough of a reward to override the high of victory, fulfilling your dreams and becoming what we know we can become.

Do I eat cheat meals? YES— but only because of science. If you eat clean every day, your body becomes lazy on digestion because it knows all is clean and easily digested. But if you throw in a cheat meal, you force the digestive system to be honest and it helps to keep your metabolic rate high. So, a cheat meal is not a means of reward, but a means of success to keep the body working for your dreams. I eat a cheat meal usually on the weekend and I do it early in the day to ensure my body burns it all up without any negative residual balance to the day.

**I STARTED LIFTING PRETTY HEAVY ABOUT A YEAR AGO. I'VE LOST WEIGHT BUT I'M STILL UNHAPPY WITH MY ABS. I CAN'T SEEM TO GET A SIX-PACK NO MATTER WHAT I DO. I HAVE BEEN DOING CORE EXERCISES EVERY DAY, TRY TO SWITCH UP THE EXERCISES AND I EAT CLEAN. IS THERE ANYTHING ELSE I SHOULD BE DOING?**

Keep doing what you are doing! You are on the right path— one that leads to a promised physique— but ROME wasn't built in a day. When climbing a mountain, most can do the first 80 percent of the climb. The next 10 percent usually wipes out half the field, then another 40 percent go in the next 5 percent of the incline— leaving only a select few to say they reached the pinnacle of their quest.



The thing is, the last 5 percent will take you twice as long and is probably 10 times the work— and that should excite you, not discourage you. Why? Because almost NO one does it. Typically people sit around knowing they can be better. When you embark on a journey, you should know the value of the journey. When time on the job starts to get hard, welcome it— because you are already in an elite status that few can say they have ever experienced.

To have a ripped eight-pack is not a birthright; it's an achievement. Few get it, and those who do inspire all to try. Continue the

journey you have started because the world needs more people who believe in themselves more than settling for what most do. The expression "Pride is forever, pain is temporary" is a very true statement. In order to understand it, you must endure the pain long enough to cross the finish line where pride replaces pain. If you quit prior to experiencing the pride, it will be the "pain" that lasts forever. Be one of the few who not only talks the game, but also sees it through and creates a path for others.

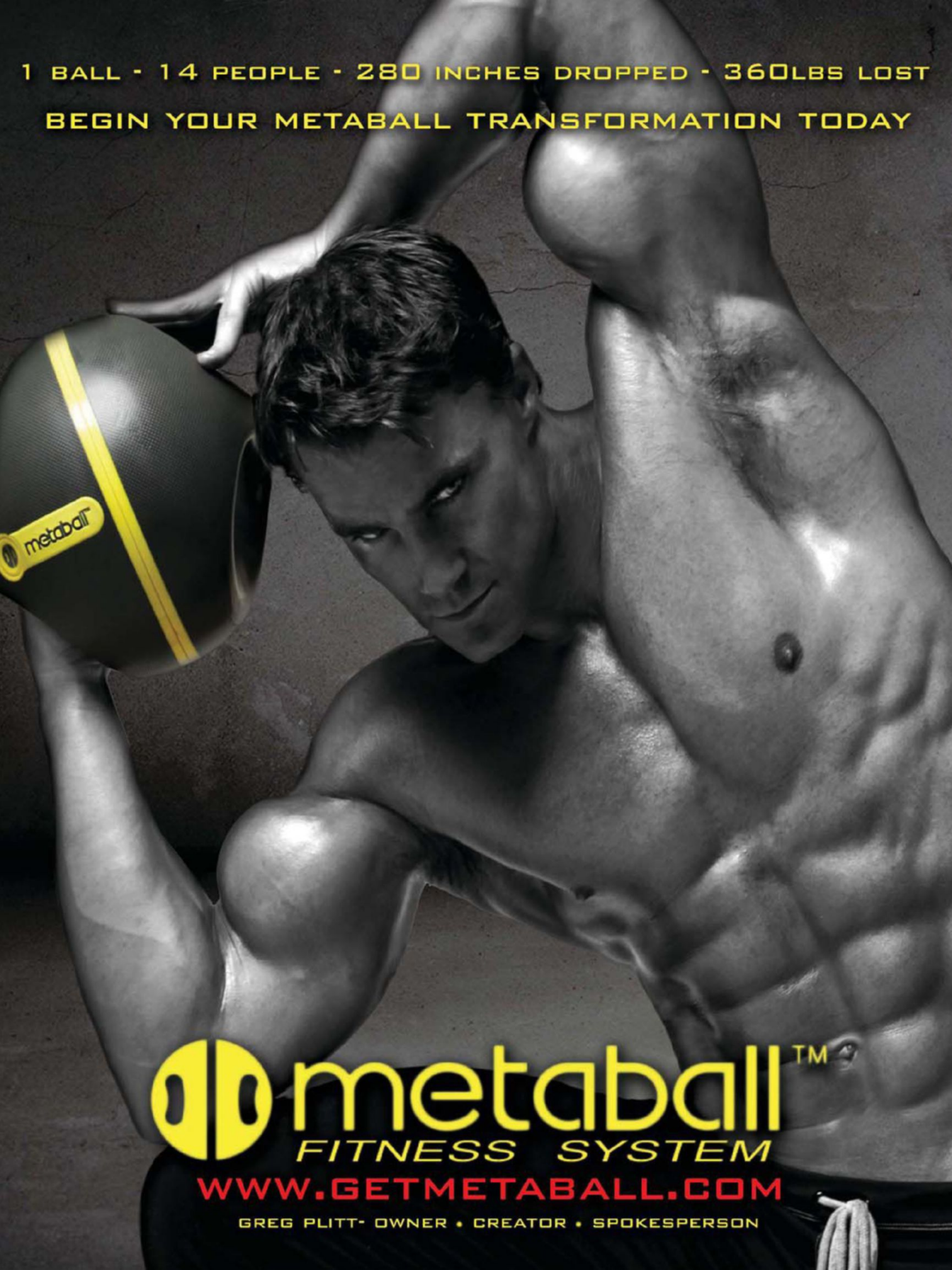
Have a question for Greg? Email it to [editor@fitnessrxmag.com](mailto:editor@fitnessrxmag.com). ■

## BIOGRAPHY

Greg Plitt is America's #1 male fitness model and has appeared on the cover of more than 100 fitness magazines in the last few years and has also appeared on TV in Bravo's "Work Out," HGTV's "Designed to Sell" and NBC's "Days of Our Lives." Before taking on acting and modeling, Greg graduated from West Point U.S. Military Academy and served as an Army Ranger as well as a captain and company commander of 184 U.S. soldiers. For more information, visit [www.gregplitt.com](http://www.gregplitt.com).



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